# Monitoring and Evaluation Plan of the Liberia Compact between the United States of America, acting through the Millennium Challenge Corporation and the Republic of Liberia

**October 2019**

**Version 2**

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# PREAMBLE

This Monitoring and Evaluation (M&E) Plan:

- is part of the action plan set out in the MILLENNIUM CHALLENGE COMPACT (Compact) signed on October 2, 2015 between the United States of America, acting through the Millennium Challenge Corporation, a United States Government corporation (MCC), and the Republic of Liberia acting through its government;
- will support provisions described in the Compact; and
- is governed by and follows principles stipulated in the *Policy for Monitoring and Evaluation of Compacts and Threshold Programs* (MCC M&E Policy).

This M&E Plan is considered a binding document, and failure to comply with its stipulations could result in suspension of disbursements. It may be modified or amended as necessary following the MCC M&E Policy, and if it is consistent with the requirements of the Compact and any other relevant supplemental legal documents.

# LIST OF ACRONYMS

| | |
|---|---|
| BA | Beneficiary Analysis |
| CA | Constraints Analysis |
| CCR | Compact Completion Report |
| CPS | Common Payment System |
| CT | Current transformer |
| DQR | Data Quality Review |
| EPA | Environmental Protection Agency |
| ERR | Economic Rate of Return |
| ESP | Environmental and Social Performance |
| GoL | Government of the Republic of Liberia |
| GPOBA | Global Partnership on Output-Based Aid |
| GSI | Gender and Social Inclusion |
| HFO | Heavy Fuel Oil |
| ITT | Indicator Tracking Table |
| kV | Kilovolt |
| kW | Kilowatt |
| kWh | Kilowatt hour |
| LACEEP | Liberia Accelerated Electricity Expansion Project |
| LCPDP | Least Cost Power Development Plan |
| LEC | Liberia Electricity Corporation |
| LISGIS | Liberia Institute of Statistics and Geo-Information Services |
| M&E | Monitoring and Evaluation |
| MCA | Millennium Challenge Account |
| MCA-L | Millennium Challenge Account Liberia |
| MCC | Millennium Challenge Corporation |
| MCC MIS | MCC Management Information System |
| MCHPP | Mt. Coffee Hydropower Plant |

| | |
|---|---|
| MHI | Manitoba Hydro International |
| MLME | Ministry of Lands, Mines and Energy |
| MoGCSP | Ministry of Gender, Child and Social Protection |
| MoT | Ministry of Transportation |
| MPW | Ministry of Public Works |
| MW | Megawatts |
| NGO | Non-governmental organization |
| NPV | Net Present Value |
| PIU | Project Implementation Unit |
| POC | Point of contact |
| PV | Present Value |
| QDRP | Quarterly Disbursement Request Package |
| RMC | Regional Maintenance Center |
| RMMS | Road Maintenance Management System |
| RREA | Rural Renewal Energy Agency |
| SAIDI | System Average Interruption Duration Index |
| SAIFI | System Average Interruption Frequency Index |
| SGA | Social and Gender Assessment |
| WAPP | West African Power Pool |
| WDI | World Development Indicator |

# COMPACT AND OBJECTIVE OVERVIEW

## Introduction

This Monitoring and Evaluation Plan serves as a guide for program implementation and management, so that the Millennium Challenge Account Liberia (MCA-L) management staff and Board of Directors, the Board of Directors of the Liberia Electricity Corporation (LEC), Implementing Entities, implementers, beneficiaries, and other stakeholders understand the progress being made toward the achievement of objectives and results, and are aware of variances between targets and actual achievement during implementation.

This Monitoring and Evaluation Plan is a management tool that provides the following functions:

- *Describes the program logic and expected results.* Gives details about what impacts the Compact and each of its components are expected to produce in economic, social inclusion, and gender-related outcomes and how these effects will be achieved.
- *Sets out data and reporting requirements and quality control procedures.* Defines indicators, identifies data sources, and frequency of reporting in order to define how performance and results will be measured. Outlines the flow of data and information from the project sites through to the various stakeholders both for public consumption and to inform decision-making. It also describes the mechanisms that assure the quality, reliability and accuracy of program performance information and data.
- *Establishes a monitoring framework.* Establishes a process to alert implementers, MCA-L management, LEC management, stakeholders and MCC to whether or not the program is achieving its major milestones during program implementation and provides the basis for making program adjustments.
- *Describes the evaluation plan.* Explains in detail how MCA-L and MCC will evaluate the Compact interventions to determine whether they are achieving their intended results and expected impacts over time.
- *Includes roles and responsibilities.* Describes in detail what the M&E staff are responsible for and outlines any M&E requirements that MCA-L and LEC must meet in order to receive disbursements.

## Program Logic

### Compact Background

Liberia is located on the western coast of Africa and has a population of approximately 4.4 million[1] people covering 37,420 square miles that border Guinea to the north, Côte D'Ivoire to the east, Sierra Leone to the west, and the Atlantic Ocean to the south.

Liberia is a post conflict country still working to revive itself from a fourteen year civil war, which decimated much of the country's existing infrastructure before ending in 2003. Despite Liberia's strong economic growth, averaging 7%[2] since 2009, it ranks 168$^{th}$ out of 214

[1] World Bank, WDI, 18 September 2015. Washington, DC. However, the Least Cost Power Development Plan (LCPDP) estimates the population at approximately 4.0 million.
[2] World Bank, Project Appraisal Document, Liberia Accelerated Electricity Expansion Plan, p.1. May 2013.

countries in terms of Gross National Income per capita, at approximately US$700 (Purchasing Power Parity).[3] The economy is primarily dependent on subsistence agriculture and export of raw materials. Approximately half of the population is rural.

Despite the macroeconomic gains and relative stability over recent years, the Liberian economy remains vulnerable to external shocks given the volatility of commodity prices, its limited diversification, its dependence on imported foods and fuel, constraints to business investment and productivity, the insufficient supply and prohibitive high cost of energy generation and its deplorable road network.[4]

The Government of Liberia (GoL) and MCC undertook a Constraints Analysis (CA) to better understand the constraints to economic growth in Liberia. The CA, which was completed in September 2013, was based on the growth diagnostic methodology developed by Ricardo Hausmann, Dani Rodrik and Andrés Velasco of the Kennedy School of Government at Harvard University. Liberia's CA revealed two binding constraints to private sector investment, poverty reduction and economic growth in Liberia: (i) lack of access to reliable and affordable electricity; and (ii) high cost of and limited access to road infrastructure.

In September 2013, the GoL and MCC also conducted a Root Cause Analysis workshop to dive deeper into the underlying causes of the two binding constraints. Utilizing the principles of Results Focused Project Design,[5] the GoL and MCC, together with key stakeholders, identified a variety of root causes that contributed to the binding constraints identified in the CA. The root causes for unreliable power infrastructure were organized into three overarching areas: the existence of weak policy and regulatory environment, insufficient supply and distribution of electricity, and weak capacity across institutions in the electricity sector. The root causes of poor road infrastructure were also grouped into three areas: a weak policy and regulatory environment, inadequate planning and budgeting, and inadequate implementation and maintenance.

On October 2, 2015, the United States of America through the Millennium Challenge Corporation and the Government of Liberia signed a US$257 million Compact designed to reduce poverty through economic growth by investing in energy and road maintenance projects in Liberia. The selection and design of Compact Projects was informed by the Constraints Analysis and subsequent Root Cause Analysis. The Compact also supports key development priorities of the GoL as identified in the *Agenda for Transformation*, a five-year development strategy for FY 12-17, and *Liberia RISING 2030*, which is Liberia's long-term vision of socio-economic and political transformation and development.

The Compact officially entered into force on January 20, 2016.

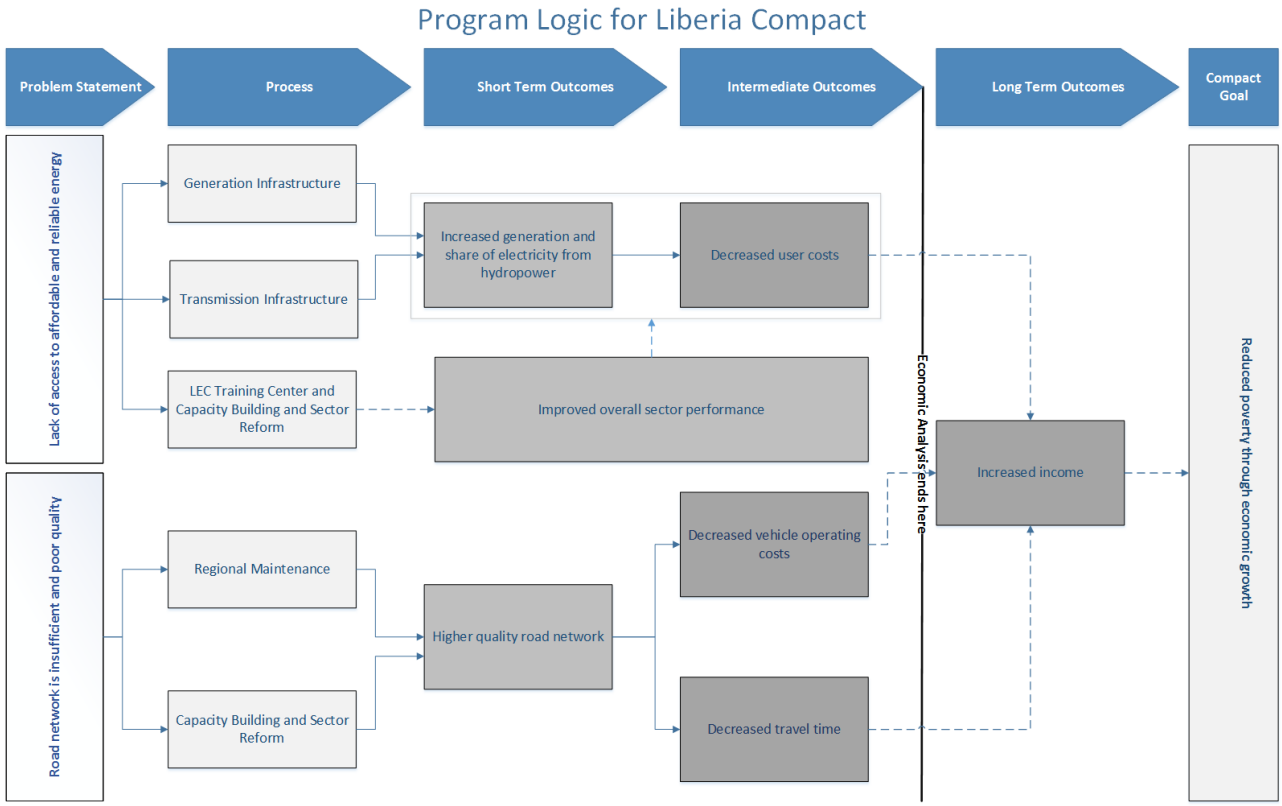
[3] Ibid., WDI.
[4] See Liberia Constraints Analysis, MCC & Liberia Core Team, 2013 and World Bank, Liberia Accelerated Electricity Expansion Project, Project Appraisal Document, 2013, p.1.
[5] Asian Development Bank, "Guidelines for Preparing a Design and Monitoring Framework," Project Performance Management System, Second Edition, July 2007.

## Compact Logic

The goal of the Liberia Compact is to reduce poverty through economic growth. MCC's assistance will be provided in a manner that strengthens good governance, economic freedom, and investments in the people of Liberia. The objectives of the Projects are to: (i) provide access to more reliable and affordable electricity; and (ii) improve the planning and execution of routine, periodic and emergency road maintenance. These goals and objectives are expected to be realized through MCC's investments, which are expected to increase power generation and the share of generation from renewable sources, improve overall power sector performance, and provide funding and support to improve the road maintenance system.

The diagram below illustrates and describes the expected causal relationships among the program components and synthesizes outcomes intended to achieve the Project objectives and the program goal.

**Figure 1: Liberia Compact Logic**




## Project Description and Logic

### *Energy Project Description and Logic*

At the time of Compact approval, Liberia had an electrification rate of less than two percent and one of the highest electricity tariffs in the world at US$0.52 per kilowatt hour (kWh). The average cost of generation for countries in sub-Saharan Africa was about US$0.15 per kWh, ranging from US$0.05 in energy-rich countries such as Nigeria to about US$0.25 for less energy-endowed countries like Cabo Verde. According to the World Bank, "the main reason for high cost of electricity in Liberia is the dependency on high-cost diesel generation."[6] The

[6] World Bank, Project Appraisal Document - LACEEP, May 2013, p.2.

CA also asserted that these costs mainly resulted from the destruction of Liberia's hydroelectric dam, which was the country's single largest source of power before the war, and the diminished capacity of LEC which provided as much as 191 Megawatts (MW) of electricity prior to the war. At Compact signing in 2015, LEC provided only 22 MW of power, which represented an increase from 9.6 MW in 2009. Liberia's power supply was also unreliable with frequent planned and unplanned outages.

The Compact's Energy Project aims to address several of the problems facing the energy sector in Liberia through four Activities. The Mt. Coffee Rehabilitation Activity aims to address the overarching problem in the energy sector, i.e., the lack of access to affordable and reliable electricity by increasing the amount of electricity generated in Liberia, facilitating a decrease in the overall electricity tariff, and helping to increase reliability and adequacy of electricity.

The Mt. Coffee Rehabilitation Activity builds on ongoing rehabilitation efforts funded by the Government of Norway, the German Development Bank, and the European Investment Bank. Initially, Mt. Coffee Hydropower Plant (MCHPP) was to be rehabilitated to a rated capacity of 66 MW with the GoL providing 20% of the costs. Rehabilitation costs increased substantially as a result of cost overruns and changes to the design, delays caused by the Ebola Virus Disease outbreak, and the decision to expand MCHPP's capacity to 88 MW in part due to the expected availability of MCC funding. The Mt. Coffee Rehabilitation Activity assumes responsibility for the GoL's financial commitment and includes the following specific components:

- the additional cost required to provide a total installed generation capacity of up to 88 MW;
- funding to cover gaps between existing stakeholder commitments and a total cost to complete the rehabilitation of MCHPP in an amount not to exceed $357 million;
- the cost of a second 66 kV transmission line from MCHPP to the Paynesville substation; and
- costs related to the establishment of certain dispute adjudication boards.

The remaining activities in the Energy Project are intended to support the results of the Mt. Coffee Rehabilitation Activity and address other root causes of the problems in the sector. The Energy Sector Reform Activity aims to address the weak policy and regulatory environment by providing support to the key institutions responsible for policy making, investment planning, asset management, and environmental, gender and social oversight of the sector – namely Ministry of Lands, Mines and Energy (MLME), and LEC. This Activity comprises two Sub-Activities[7]:

- *Establishment of an Independent Regulator Sub-Activity*. Building upon planned programming from the European Union and the Government of Norway which focuses on the development of MLME's Department of Energy, this Sub-Activity will assist in standing up an independent regulatory agency. The Sub-Activity will include a number of studies, including a situation assessment for the sector; demand, willingness-to-pay, and cost of service studies.

[7] The Compact described a third Sub-Activity that is no longer planned.

- *Management Support to LEC Sub-Activity*. This Sub-Activity supports the tendering and implementation of a management services contract for LEC. This short-term plan, selected by the GoL and informed by a study of public management and private sector participation options for LEC, will help lead to a financially sustainable utility. Other management options, such as a concession, are still within LEC's long-term vision for the utility.

The LEC Training Center Activity aims to improve capacity in the sector by building LEC's technical, operational, financial, and administrative capacity, and forming the core base for training of technicians in the electricity sector.

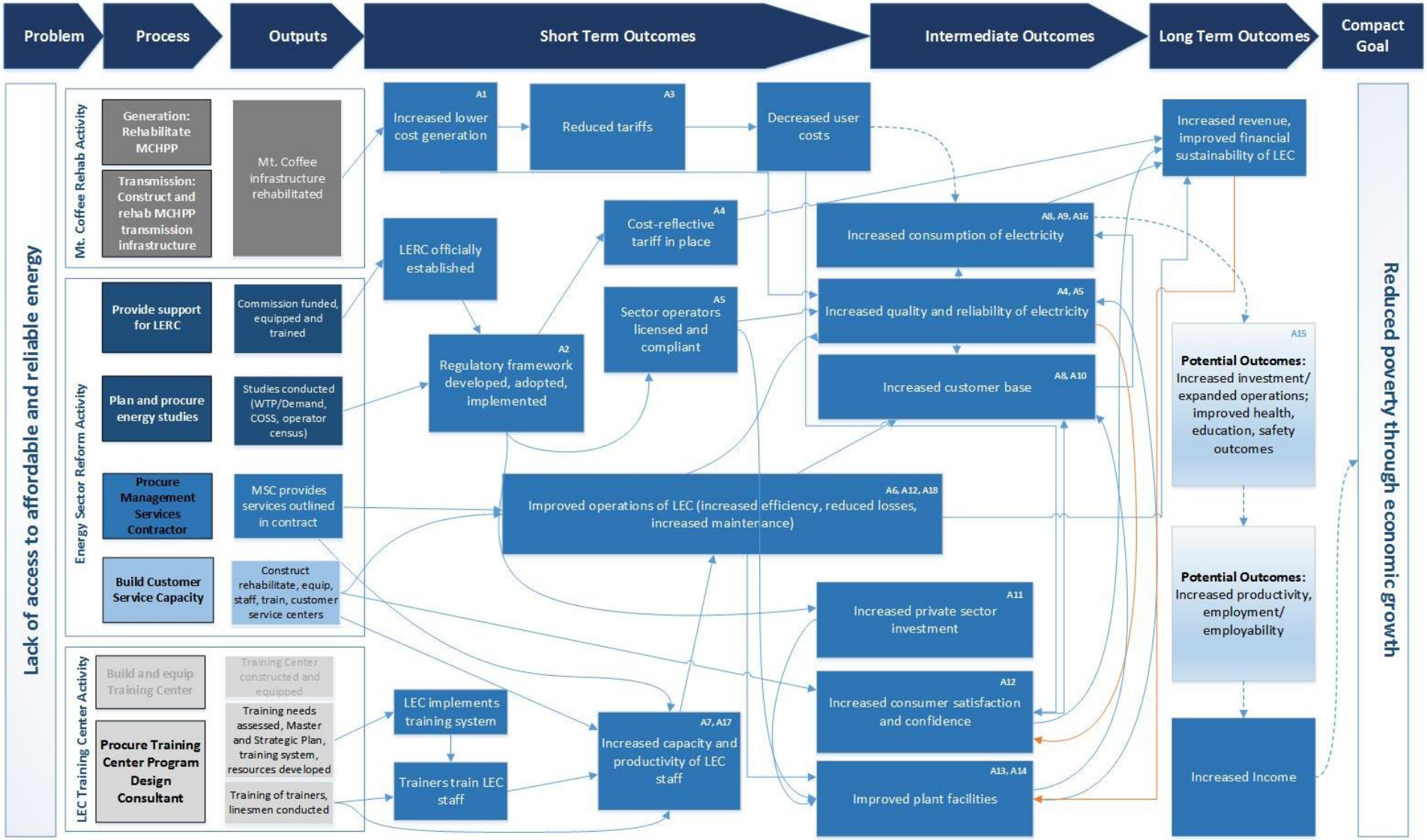
The Mt. Coffee Support Activity aims to provide additional support to the Mt. Coffee Rehabilitation Activity to mitigate environmental and social risks and ensure long-term sustainability. For example, MCC funding will support:

- the provision of small-scale community infrastructure (e.g., bridges) in order to ensure communities and/or settlements surrounding the MCHPP reservoir are not permanently blocked from accessing their farms, settlements, and/or other social services (e.g., health clinics, schools);
- additional human resources support to LEC, including the Project Implementation Unit (PIU), to ensure timely and professional management, oversight and reporting of environmental and social impacts and risks;
- a watershed management plan (including climate change and fisheries studies); and
- the cost of rehabilitating the raw water intake at MCHPP from the power house to the MCHPP site boundary; and
- rehabilitation of the raw water transmission line from MCHPP to the White Plains Water Treatment Works.

Finally, the Energy Project will also include technical assistance support to strengthen socially inclusive and gender-responsive planning and implementation capacity of MLME and LEC as a part of the Energy Sector Reform Activity.

The diagram below illustrates and describes the expected causal relationships for the Activities contributing to achieving the objective of the Energy Project.

**Figure 2: Liberia Energy Project Logic**



The logic diagram above reflects the following set of assumptions:

A1 – Bringing Mt. Coffee online will lower LEC's operating costs.

A2 – Planned technical support from other donor(s) will complement MCA-L's intervention. Studies funded under the Compact will inform the implementation of the regulatory framework, including the tariff-setting process, and licensing operators.

A3 – Cost savings from lower-cost generation will be passed onto consumers; tariffs will recover the utility's costs, which is critical for running a sustainable utility.

A4 – The tariff-setting process will adhere to LERC's regulations as stipulated in Section 13.3 of the 2015 Electricity Law and will be insulated from political interference.

A5 – LERC has the ability and resources to ensure compliance.

A6 – LEC has the capacity and resources to manage its operations effectively and efficiently, including reducing losses, increasing collections, and performing routine maintenance; LERC standards are effective.

A7 – There is sufficient staff capacity and continuity in order to accomplish MSC capacity building objectives. Increased capacity is sustained after MSC ends.

A8 – LEC increases ability to make customer connections. New customers can afford to pay for electricity; LEC can accommodate increased energy demand during dry season.

A9 – Increased generation capacity and the planned T&D investments are capable of increasing the quality and reliability of electricity.

A10 – LEC has sufficient manpower, skill, materials, and operational capacity to respond to user requests for connections.

A11 – A clear regulatory framework is a critical requirement for private sector investment.

A12 – Project outputs will result in appreciable improvement in customer services practices; LEC is willing and able to address customer complaints. Customer willingness to pay increases.

A13 – MSC works to attract donor funding. External actors will extend the transmission and distribution networks as planned. These extensions are critical to expanding LEC's consumer base.

A14 – LEC will invest in lifecycle maintenance and capital investment.

A15 – Electricity is used productively. Cost savings are invested and other constraints such as access to finance, or lack of political stability do not inhibit additional investments.

A16 – Customers pay for the electricity they consume.

A17 – Training of trainers system is effective.

A18 – The MSC is able to effect long-term change in LEC operations and stakeholders with interest and influence support these changes.

***Roads Project Description and Logic***

Although responsible for road maintenance, the Ministry of Public Works (MPW) does not currently have the financial resources to conduct sufficient maintenance. This is further exacerbated by the lack of existing data. An inventory of the road network did not exist at the time of Compact signing, and assessments were only done visually. This situation made it impossible to take a holistic approach to road maintenance planning and execution, even if

funding had not been a constraint. Additionally, maintenance standards - routine, periodic, rehabilitation - were not well defined, and MPW was not able to state what the backlog or future maintenance requirements were for the network as a whole. What data were collected were at a very basic level and done sporadically.

Before the war, the unpaved road network was maintained in fairly good, all-weather quality. Since the war, however, maintenance had deteriorated for the reasons described above. In addition, during the rainy season most, if not all, of the unpaved roads deteriorated significantly, exerting a severe toll on individuals and businesses. Before the Compact started, Liberia recorded the highest freight cost during the rainy season at about US$0.50/MT/km compared to the rest of sub-Saharan Africa, where costs range from US$0.04-US$0.14/MT/km. The cost of transporting goods during the rainy season from parts of the country where road networks deteriorate significantly to Monrovia escalated by about 53%.[8] Further, road maintenance was undertaken mostly on an emergency repair basis, significantly raising the cost of road works and straining further an already miniscule budget.

The Roads Project aims to address such problems in the sector and improve the quality of Liberia's road network by supporting the piloting of a new maintenance regime and by building capacity. The Project Activities are expected to improve the weak policy and regulatory environment and inadequate maintenance occurring in the roads sector. Ultimately, improved management of the road sector is expected to result in a larger stock of well-maintained roads, which will decrease vehicle operating costs and provide time savings for road users.

The Roads Project consists of the National Road Maintenance Activity and the Roads Sector Reform Activity.

The National Road Maintenance Activity aims to match GoL contributions for periodic road maintenance in an effort to better maintain and sustain Liberia's primary paved and unpaved roads and increase institutional capacity in the sector.

- *Matching Road Maintenance Fund Sub-Activity.* MCC funding will match GoL contributions that have been deposited by the GoL to an account (Matching Road Maintenance Fund Account) that are dedicated to periodic road maintenance on a one to one basis up to $15 million during the Compact Term, subject to measurable indicators of performance on maintenance planning, capacity and implementation.

The Roads Sector Reform Activity aims to build capacity and provide technical assistance to the sector through the following tasks:

- Network Analysis/Data Collection: The United States Department of Transportation (DoT) will partner with the GoL via MCC/MCA-L to assist in collecting roadway condition, traffic volume, and other data for models to develop a national road inventory and support road maintenance planning.
- Sector Reform/Institutional Strengthening/Capacity Building: This task is intended to assist MCC ensure that Compact transportation sector investments are coordinated with the projects of other major donors, and compliment their efforts in in road

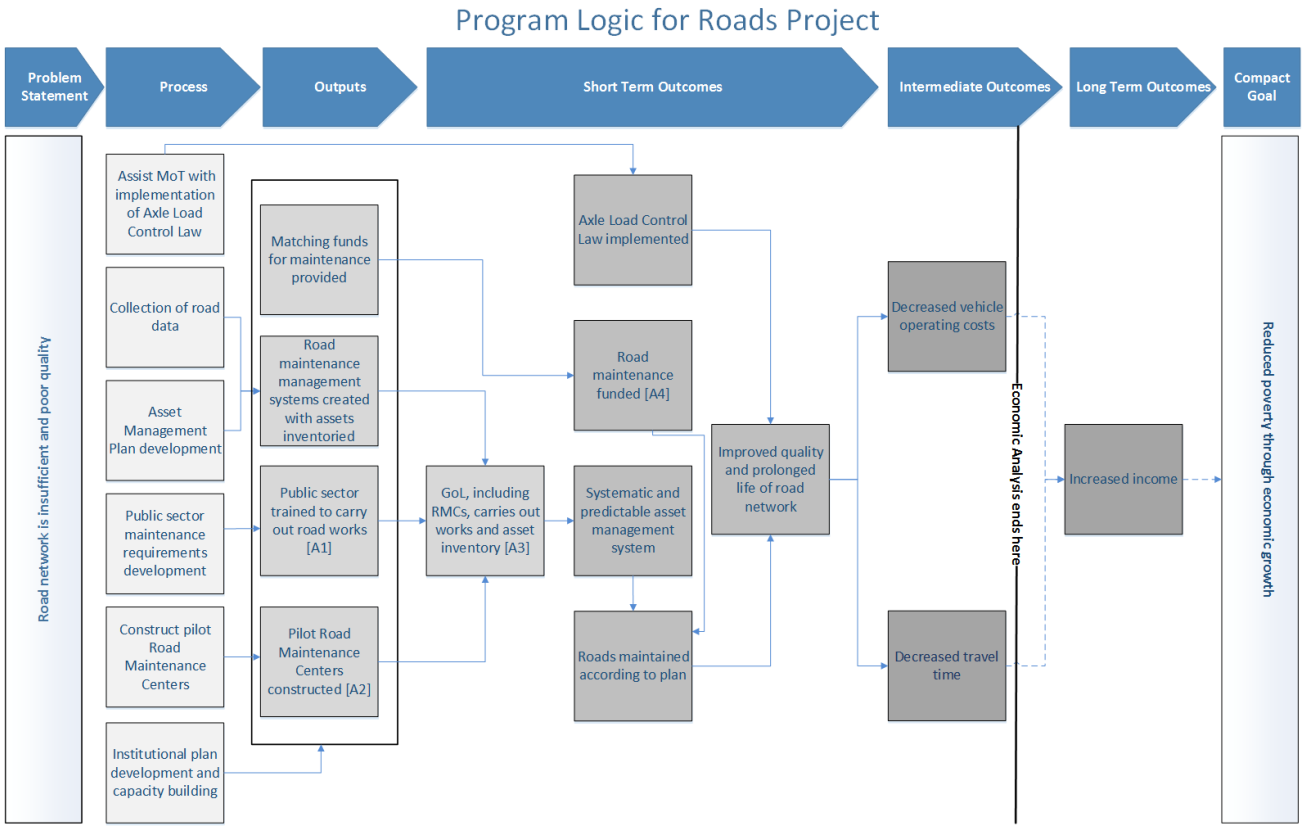
[8] CA, p. 156.

maintenance activities and any other transportation planning and capacity building activities.

Finally, the Roads Project will also aim to strengthen socially inclusive and gender-responsive planning and implementation capacity of MPW.

The diagram below illustrates and describes the expected causal relationships and outcomes for the Roads Project.

**Figure 3: Roads Project Program Logic**[9]




The logic diagram above reflects the following set of assumptions:

A1 – The private sector is prepared and capable of performing maintenance.

A2 – The GoL will ensure that the pilot Road Maintenance Centers have an appropriate number of staff, who are compensated sufficiently.

A3 – The GoL will determine which units will carry out relevant functions as a part of the Compact interventions.

A4 – Funds continue to be available with some level of predictability.

[9] A new logic diagram that reflects the modification of the Roads Project is currently under development and will be reflected in a subsequent M&E Plan revision.

## Projected Economic Benefits[10]

An initial economic analysis of the Mt. Coffee Rehabilitation Activity was carried out prior to Compact approval. As shown in Table 1, using base-case assumptions (which are described below), the economic rate of return (ERR) for the Activity is 13%; however, Table 3 provides a range of ERRs that vary depending on key parameters of the model; these parameters will be reassessed as the project is implemented. This initial economic analysis was developed before other components of the Energy and Roads Projects were fully designed. It is expected that further cost benefit analysis will be done as the remaining Compact investments are defined sufficiently to calculate their economic returns.

**Table 1. Summary of Economic Analysis Results**

| Project | Activity | Original Project-Level ERR | Original Activity-level ERR | Date Original Economic Rate of Return (ERR) Established | Revised Project-Level ERR | Revised Activity-level ERR | Date Revised Economic Rate of Return (ERR) Established |
|---|---|---|---|---|---|---|---|
| Energy Project | Mt. Coffee Rehabilitation Activity | 11% | 13% | 06/2015 | N/A | N/A | N/A |
| | Mt. Coffee Support Activity | | Not Calculated | N/A | | N/A | N/A |
| | LEC Training Center Activity | | Not Calculated | N/A | | N/A | N/A |
| | Energy Sector Reform Activity | | Not Calculated | N/A | | N/A | N/A |
| Road Project | National Roads Maintenance Activity | Not Calculated | Not Calculated | N/A | N/A | N/A | N/A |
| | Roads Sector Reform Activity | | Not Calculated | N/A | | N/A | N/A |

### Energy Project Economic Analysis

The supply and distribution of electricity in Liberia is extremely limited, both in terms of the number of connections and the total demand for those connections. The table below shows the number of existing, active customers on the grid and their estimated peak load use of electricity at the time the Liberia Least Cost Power Development Plan (LCPDP) was prepared. Until May

[10] This section will be updated in a subsequent M&E Plan revision to document key updates to the economic analysis of the Energy Project.

2016, customers paid a tariff of $0.52/kWh (as reported by Manitoba Hydro International (MHI)),[11] due to the high fuel price for the high speed diesel generators that are currently used for LEC's entire supply of electricity.

**Table 2. LEC Customer Structure (2013)[12]**

| Customer Category | No. of Active Customers | Estimated Average Peak Load per Customer |
|---|---|---|
| Low income (single phase prepaid meter) | 6,459 | 0.21 kW |
| Residential/small commercial, GoL and NGO single phase | 6,447 | 0.59 kW |
| Commercial, GoL and NGO (three phase) | 490 | 3.4 kW |
| GoL CT-metered | 44 | 49 kW |
| Commercial CT-metered | 65 | 25 kW |
| **TOTAL** | **13,505** | |

As described above, power generated by MCHPP is expected to reduce the price of electricity for customers. For those already on the grid, they are expected to have fairly minimal increase in demand due to the change in cost. The estimated price elasticity of demand is -0.2.[13] The largest portion of the benefits for existing customers is from a one-time price decrease. After that, their utility will be measured by the amount they consume. The majority of the increase in demand, thus, is expected to be gained through additional connections to the grid. For new customers to the grid, they will receive a one-time benefit scaled by their willingness to pay, followed by a similar valuation based on their consumption. The economic rate of return depends heavily on this increase in demand from new connections.

Developing new connections is critical to the commercial viability of LEC. Until now, LEC has kept their customer base relatively small, largely because they did not have enough generation capacity to increase their base without worsening already considerable load shedding. As a result, however, we know little about what the potential scale up of the customer base will look like. While we know that there are generally plans by donors to fund up to 90,000 new household and commercial connections, we only know the general expected timing of those new connections, the timing of new industrial connections.[14] We still do not know much

[11] MHI is a private company that has been contracted to manage LEC.
[12] "Preparation of a Government of Liberia Least Cost Power Development Plan (LCPDP)," 2014. Prepared by Fichtner for MLME and LEC.
[13] Fichtner, LCPDP; 5-9.
[14] MCC has learned about plans to fund additional connections since the economic analysis of MCHPP was initially developed. However, we are still trying to clarify the magnitude and timing of those plans, along with

about the capacity of LEC and/or its contractors to make the connections, and the readiness of the households and firms to access grid electricity, but LEC, donors funding connections, and McKinsey (which has developed a set of private sector management options for LEC) are confident in the overall number of connections to be established. Given the uncertainty around connections, the following are some potential scenarios of connections and the concomitant ERRs.

**Table 3. Connection Scenarios and ERRs**

| Scenario Name | Demand (MW) | Number of Connections (Industrial) | Number of Connections (Household) | Timeline for Connections | ERR (all Project costs) | ERR (Mt. Coffee Rehabilitation Activity costs only) |
|---|---|---|---|---|---|---|
| **Base scenario from LCPDP** | 52 | 1,450 | 90,000 | 2020 | 11% | 13% |
| **Pessimistic scenario (Low demand, slow connections)** | 26 | 1,000 | 90,000 | 2025 | 3% | 5% |
| **Low trust of LEC scenario (Low demand, quick connections)** | 26 | 1,000 | 90,000 | 2018 | 7% | 9% |
| **Low LEC capacity scenario (High demand, slow connections)** | 75 | 3,000 | 150,000 | 2025 | 14% | 16% |
| **Optimistic scenario (High demand, quick connections)** | 75 | 3,000 | 150,000 | 2018 | 17% | 20% |

longer-term plans for the electricity tariff. We expect that the economic analysis will be updated once these inputs have been obtained.

The base case scenario, as outlined in Fichtner's LCPDP, includes a number of assumptions about growth and demand of users connected to the grid. Aside from the numbers of connections to the grid and the decreased tariff rate after MCHPP begins operating, other assumptions include:

- Price elasticity of demand = -0.2[15]
- World Price of Oil = US$100 per barrel in 2015, assumed to drop to $75 per barrel after that[16]
- Capacity Factor = .592 once all four Mount Coffee turbines are online[17]
- Load Factor = 0.72 for commercial users and 0.5 for residential[18,19]

While it is clear from available demand surveys that there is market demand for the cheaper generation provided by MCHPP, there is much that is uncertain about the scope and timeline of connecting that additional demand and whether there are other hindrances to connecting customers and to reaching the level of demand that would make generation at this scale economically viable.

There are very limited large businesses or housing complexes that could readily connect to the grid under the current scale of grid penetration. The question thus remains on how the grid will expand, who will pay for the expansion of connections, and whether businesses and households will be able and willing to connect. A willingness-to-pay study executed in the Monrovia area by the World Bank's Global Partnership on Output-Based Aid (GPOBA) in 2010 suggested that there is a fairly high willingness to pay, and only a small percentage (~15%) of households would not be able to afford to wire their house or purchase a Ready Board (small unit that obviates the need to wire a house, meant primarily for one room households). Donors have plans to fund over 90,000 new household and commercial connections, and LEC has done a demand study of potential larger customers to target for connection. Nevertheless, MCC experience in other contexts suggest that even when, by all accounts, there are customers clamoring for connections, they do not always take the steps required to acquire network connections. Thus the question remains how and when these connections will be completed and whether the demand projections by various parties (Fichtner (in the LCPDP), LEC, and others) will play out.

If we follow the base case for demand projected by Fichtner, we get an ERR of 11%, inclusive of all capacity building activities that support the Mt. Coffee Rehabilitation Activity (both operations and maintenance) and connecting new customers to the grid (e.g. the LEC Training Center Activity). Just including costs currently envisioned by the donors, the ERR would be 13%. However, if the connection activities do not progress as envisioned or there are unforeseen barriers to accessing electricity, the ERR could drop well below the hurdle rate of 10%. For this reason, the Compact includes a connection assessment analysis that could identify and potentially help close the gaps to facilitate network access.

There are a number of investments included in the costs, whose potential benefits were not quantifiable at the time of the investment decision and which thus are not included in the model.

[15] LCPDP, 5-9.
[16] Calculations based on Technical and Financial Feasibility Study for the Reconstruction and Expansion of the Mount Coffee Hydropower Facility in Liberia, Stanley Consultants; 8-38.
[17] LCPDP, 11-21.
[18] LCPDP, 5-16
[19] For a full list of assumptions used in Fichtner's Least Cost Power Development Plan, see pages 5-12 and 5-14.

When designs for these activities are developed, the economist will revisit the possibility of developing cost benefit analysis. These include:

i. **LEC Training Center Activity.** Though the benefits have not been quantified, in the medium or long term, the capacity to train staff locally will be necessary to support LEC's operations and maintain their fixed capital resources.

ii. **Second circuit transmission line to Paynesville (part of the Mt. Coffee Rehabilitation Activity).** The purpose of this transmission line is as a redundancy in case the first circuit ever fails. The probability of this occurring and then knowing how long the ensuing outage would last would be two critical variables to know in order to calculate the benefit of adding the second circuit. Unfortunately, we have no historical data or other means by which to estimate these figures and thus cannot calculate the benefits directly attributable to this redundancy.

iii. **Energy Sector Reform Activity.** Lack of capacity was highlighted in the Root Cause Analysis along a number of dimensions, affecting the ability to operate, maintain, and expand electricity operations by LEC and MLME. Because designs do not yet exist for these activities, nor specific targeted outcomes, it is at the moment infeasible to conduct cost benefit analysis on this Activity.

iv. **Mt. Coffee Support Activity.** Similar to the Energy Sector Reform Activity, there is no detailed design of these activities to be able to create a cost benefit analysis.

v. **Water intake (part of the Mt. Coffee Rehabilitation Activity) and water pipeline (part of the Mt. Coffee Support Activity).** Based on the information available at the time of the investment, salinity increases as a result of the MCHPP and downstream of the MCHPP was considered a serious risk created by the MCHPP and mitigation measures were included in the Compact. These investments are not necessary to see the benefits of MCHPP, but they respond to MCC's concerns at the time the investment decision was made. There could be a completely separate program logic related to water intake. However, based on the information available at the time of the investment decision, it was not possible to build a robust economic model. Apart from mitigating a serious risk there would be additional benefits from a substantially expanded supply of water for Monrovia and decreased operating costs associated with a gravity-fed supply as opposed to pumping water from the river as currently occurs. Since this cost is included in the MCHPP rehabilitation contracts, the costs have been included in the ERR model for the Mt. Coffee Rehabilitation Activity.

**Roads Project Economic Analysis**

At the time of MCC's investment decision, economic analysis was not available for the Roads Project. In general, road maintenance programs are expected to have significantly better economic returns than upgrading individual road segments. Thus it is expected that, once the Roads Project is designed, the team economist will conduct economic analysis and the Project has a good likelihood of achieving sufficient returns to justify the investment.

## Projected Program Beneficiaries

According to the *MCC Guidelines for Economic and Beneficiary Analysis*, beneficiaries of projects are considered individuals who experience better standards of living due to Compact activities aimed at increasing their real incomes. The economic rate of return analysis for

proposed projects gives details on benefit streams through which beneficiaries should experience increased income.

A general overview of the span of program benefits across the population of Liberia, used for Compact justification to MCC's Investment Committee, is presented in the table below.

**Table 4: Projected Program Beneficiaries**

| Project | Program Beneficiary Definition | Est. Number of Beneficiaries | Present Value (PV) of Benefits[20] | Net Present Value (NPV)[21] |
|---|---|---|---|---|
| Mt. Coffee Rehabilitation Activity | Number of individuals in households connected to the grid plus the number of commercial enterprises connected | 460,000 | $517,899,307 | $83,718,571 |
| Road Project | TBD | TBD | TBD | TBD |

**Energy Project Beneficiary Analysis**

The total beneficiary count for the Energy project, using the Fichtner base scenario, is approximately 460,000 people. If the number of household connections increased to 150,000, then a beneficiary count of 766,000 people is expected.

The Beneficiary Analysis (BA) for this project builds on the customer profile outlined in the ERR model. Beneficiaries, in this case, are defined as individuals who benefit from the increased availability of electricity through the Compact activities. This increased availability of electricity is expected to yield cost savings or otherwise improve beneficiaries' current standard of living. In the case of households, the BA counts all members of the household benefitting from the Compact, assuming an average household size of 5.1.[22]

In the case of firms benefitting from the Compact, only the owner is counted as a beneficiary. Within the ERR model, benefits accrue to firms with existing connections due to increased consumption of grid-supplied electricity, valued at an assumed willingness to pay. What the firm does with the assumed cost reduction is unknown; assuming that wages increase or that employment increases would be to include multiplier effects. Liberia experiences high unemployment which would lead to the expectation that wages would not increase without

[20] The PV of benefits are included in the ERR as the "estimated discounted increase in income over the life of the project" or the "beneficiary income gain."

[21] The NPV illustrates the net benefits, which subtract the discounted costs from the discounted benefits. Cost-benefit analysis produces two main outputs: the ERR and NPV. This provides a more complete picture and allows for comparison at this level across projects.

[22] 2008 National Population and Housing Census: Preliminary Results. Liberia Institute of Statistics and Geo-Information Services (LISGIS), 2008.

increases in labor productivity. Labor productivity increases may result from increases in capital productivity, but this would be expected to result from the employment of new capital. New capital could reduce the need for labor. Assumptions for such changes should only be made for targeted investments where extensive data has been collected on a specific sector, leading to a reasonable understanding of the expected adjustments. Thus, for the case of firms with existing grid connections, no assumption is made that firm employees benefit from the Compact. Firm owners are counted as beneficiaries but then removed, as they are expected to have been previously counted among those benefitting from residential connections and thus may be double counted.

When the results of the model indicate expected *new* commercial and industrial connections resulting from the Compact, the expected employees associated with these firms are included as beneficiaries. The average size of existing firms is used as the expected size of new firms, and the average size of households in Liberia is used to determine the assumed size of the employee's household. We do not currently have this data, so for the sake of the initial beneficiary count, all new commercial connections are estimated to have one beneficiary.

**Roads Project Beneficiary Analysis**

The activities under the Road Project are not sufficiently designed to develop a beneficiary analysis.

# MONITORING COMPONENT

## Summary of Monitoring Strategy

The Compact will be monitored systematically and progress reported regularly through the Indicator Tracking Table (ITT). There are four levels of indicators that follow from the program logic framework: (i) goal, (ii) outcome, (iii) output and (iv) process. The various indicator levels map to the program logic and thus allow Project developers and managers to understand to what extent planned activities are likely to achieve their intended objectives. Monitoring data will be analyzed regularly to allow managers of MCA-L and MCC to make programmatic adjustments as necessary with a view towards improving the overall implementation and results of the Compact. Often most outcome and goal indicators are not monitored during the life of the Compact, but rather are reported through evaluations after the Compact is complete. Those levels of results typically take longer to be achieved.

Monitoring data will be analyzed regularly to allow managers of MCA-L and MCC to make programmatic adjustments as necessary with a view towards improving the overall implementation and results of the Program.

- Goal indicators measure the economic growth and poverty reduction that occur during or, most likely, after implementation of the program. For MCC Compacts, goal indicators will typically be a direct measure of local income and are typically measured through post compact evaluations.
- Outcome indicators measure intermediate effects of an Activity or set of Activities and are directly related through the program logic to the output indicators.
- Output indicators measure the direct result of the Project Activities. They describe and quantify goods or services produced directly by the implementation of an Activity.

- Process indicators record an event or measure progress toward the completion of Project Activities. They are a forerunner to the achievement of Project outputs and a means to ensure the work plan is proceeding on a timely basis.[23]

MCC has introduced common indicators for external reporting across all MCC Compacts. The common indicators relevant to the MCA-L Compact are included in this M&E Plan.

Annex III of the Compact outlines the initial indicators for the Compact. The M&E Plan builds on this information with additional relevant indicators developed by MCC, MCA-L project managers, and implementers.

The Indicator Definition Table provides relevant details for each indicator by Project and can be found in Annex I. It provides descriptions for the indicator structure by specifying each indicator's: (i) name; (ii) definition; (iii) unit of measurement; (iv) level of disaggregation; (v) data source; (vi) frequency of reporting; and (vii) party or parties responsible.

To ensure that the Program is on track to meet its overall goals and objectives, the monitoring indicators will be measured against established baselines and targets, derived from the ex-ante economic rate of return analysis, other types of analysis, and project planning documents. The targets reflect the underlying assumptions made in program design about what each Activity would likely achieve. Baselines and target levels for each indicator are defined in Annex II.

Indicators may need to be modified in future versions of the M&E Plan. Modifications and revisions to the indicators may only be made according to the MCC M&E Policy. Any significant modifications to the indicators or other content will be summarized in Annex III of the M&E Plan per the M&E Policy.

The M&E Unit shall consult and assist Implementing Entities in setting up their data collection plans and reporting templates.

## Data Disaggregation

Where feasible and appropriate, monitoring and evaluation indicators will be disaggregated by sex, age, income, and/or vulnerable groups.

## Data Sources

The indicators identified in the M&E Plan will require the collection of a range of data from various sources within Liberia such as the Implementing Entities and implementers. To the greatest extent possible, MCA-L will attempt to harmonize data collection with other existing data sources or planned surveys and ensure that the data collected through the project are useful and cost-effective. Specific data sources are outlined in Annex I of this M&E Plan.

## Data Quality Reviews (DQRs)

Data quality is the primary responsibility of the MCA-L staff, led by the M&E Unit. The M&E Unit, other MCA-L staff, as appropriate, and implementing entities should regularly check data quality. The M&E Unit should verify that all reported data have appropriate source

[23] The indicator levels are formally defined in MCC's *Policy for Monitoring and Evaluation of Compacts and Threshold Programs.*

documentation and that calculations have been done correctly. The MCA-L M&E Unit will conduct field visits on a regular basis or whenever requested by MCC, to review the quality of the data gathered through this M&E Plan. MCA-L may also hire individual data quality monitors to monitor data collection and quality, as needed.

In addition to regular data quality checks by MCA staff, independent Data Quality Reviews (DQRs) will be conducted in accordance with the requirements of the MCC M&E Policy.

The objectives of DQRs are to assess the extent to which data meet the standards defined in the MCC M&E Policy in the areas of validity, reliability, timeliness, precision and integrity. DQRs will be used to verify the consistency and quality of data over time across implementing agencies and other reporting institutions. DQRs will also serve to identify where the highest levels of data quality is not possible, given the realities of data collection.

The particular objectives for the DQRs will include identification of the following parameters: i) what proportion of the data has quality problems (completeness, conformity, consistency, accuracy, duplication, integrity); ii) which of the records in the dataset are of unacceptably low quality; iii) what are the most predominant data quality problems within each indicator; iv) what are the main reasons behind low quality; and v) what steps can be taken to improve data quality. An initial DQR was contracted by MCC during Year 1 of the Compact; a follow-up data quality assessment of LEC data was conducted in Year 3 of the Compact; and subsequent DQRs will be contracted by MCA-L in compliance with MCC Program Procurement Guidelines.

## M&E Capacity Program

MCA-L will be responsible for ensuring regular training of key project stakeholders in monitoring and evaluation in order to build the capacity of these stakeholders to remain compliant with the M&E requirements of the Compact. The capacity building program will be need-based, as determined through a) regular staff assessments, and b) as identified in the findings of the independent DQRs.

## Standard Reporting Requirements

### Reporting to MCC: Quarterly Disbursement Request Package

Performance reports serve as a vehicle by which the MCA Management informs MCC of implementation progress and on-going field revisions to Project work plans. Currently, MCC requires that MCA-L submit a Quarterly Disbursement Request Package (QDRP) each quarter. The QDRP must contain an updated ITT and a narrative report. A complete ITT presents the preceding quarters' indicator actuals and current quarter indicator progress against targets set forth in this M&E Plan. The QDRP narrative report provides a brief description of the previous quarter's Compact implementation progress and explains how requested funds will be used in the coming quarter. The QDRP narrative is the responsibility of all staff of MCA-L. The ITT is the source for MCC's internal and external reporting on indicator progress.

Additional guidance on reporting is contained in MCC's *Guidance on Quarterly MCA Disbursement Request and Reporting Package*.

### Reporting to MCA and Local Stakeholders

Even though the QDRP is required to be sent to MCC, MCAs should also use these reports and the data included in them to assess progress and performance internally. The M&E teams attempt to align MCC and MCA reporting so that data are used to inform decision-making at both levels.

### MCA-L Board Coordination Meetings

The M&E Directorate shall be responsible for reporting M&E results to the MCA-L Board on a quarterly basis. The reports will consist of ITTs and other materials that help depict progress towards Compact targets. These updates may include recommendations that are crucial to change or guide the implementation of projects for consideration by the MCA- L Board.

# EVALUATION COMPONENT

## Summary of Evaluation Strategy

While good program monitoring is necessary for program management, it is not sufficient for assessing ultimate results. Therefore, MCC and MCA-L will use different types of evaluations as complementary tools to better understand the effectiveness of its programs. As defined in the MCC M&E Policy, evaluation is the objective, systematic assessment of a program's design, implementation and results. MCC and MCA-L are committed to making the evaluations as rigorous as warranted in order to understand the causal impacts of the program on the expected outcomes and to assess cost effectiveness. This Evaluation Component contains three types of evaluation activities: (i) independent evaluations (impact and/or performance evaluations); (ii) self-evaluation, and (iii) special studies, each of which is further described below. The results of all evaluations will be made publicly available in accordance with the MCC M&E Policy.

### Independent Evaluations

According to the MCC M&E Policy, every Project in a Compact must undergo a comprehensive, independent evaluation (impact and/or performance). The next section on

Specific Evaluation Plans will describe the purpose of each evaluation, methodology, timeline, and the process for collection and analysis of data for each evaluation. All independent evaluations must be designed and implemented by independent, third-party evaluators, which are hired by MCC. If MCA-L wishes to engage an evaluator, the engagement will be subject to the prior written approval of MCC. Contract terms must ensure non-biased results and the publication of results.

For each independent evaluation, MCA-L and relevant stakeholders are expected to review and provide feedback to independent evaluators on the evaluation design reports, evaluation materials (including questionnaires), baseline report (if applicable), and any interim/final reports in order to ensure proposed evaluation activities are feasible, and final evaluation products are technically and factually accurate. MCC's evaluation review process will follow the guidelines outlined in the MCC M&E Policy.

**Self-Evaluation**
Upon completion of each Compact program, the MCA will produce the Compact Completion Report (CCR) to document and reflect on implementation and lessons learned. The MCA-L staff will draft the CCR in the last year of Compact implementation. It should be noted that each department will be responsible for drafting its own section to the report for its own activities, subject to cross-departmental review.

**Special Studies**
Either MCC or the Government may request special studies or ad hoc evaluations of Projects, Activities, or the Program as a whole prior to the expiration of the Compact Term.

MCA-L will fund an Asset and Customer Mapping Study (ACMS) to be conducted by LEC. The study will seek to address problems associated with locating customers on the grid and the location of grid assets, and assist LEC to:

- Obtain accurate and validated network asset and customers data to accurately report on MCA-L/MCC indicators and assist LEC achieve its KPIs
- Reduce time taken to resolve customers' complaints of power outage and requests for new connections
- Improve the enforcement of transparency in LEC business operations and internal accountability
- Improve the planning, upgrading and implementation of T&D expansion projects on the national grid
- Define standards for the GIS data, and how other GIS projects will interface with the LEC Integrated Management System infrastructure in the future

## Specific Evaluation Plans

### Summary of Specific Evaluation Plans

The following table summarizes specific evaluation plans.

**Table 5: Compact Evaluation Plans**

| Evaluation Name | Evaluation Type | Evaluator | Primary/ Secondary<br>Methodology | Final Report Date |
|---|---|---|---|---|
| **Energy Project Evaluation** | Performance | Mathematica Policy Research | Pre-post | 05/20/2025 |
| **Roads Project Evaluation** | Performance | International Development Group | Other | 03/01/2024 |

## Energy Project Evaluation

### *Evaluation Questions and Methodology*

The following evaluation questions and methodology applies to the Mt. Coffee Rehabilitation and Energy Sector Reform evaluation. Evaluation designs for the remaining Energy Project Activities are under review.

| Overarching research questions | Evaluation design and methods |
|---|---|
| 1. Were the activities implemented as planned?<br>2. What was the quality of implementation of the activities?<br>3. What lessons can be drawn from implementation of the activities? | Implementation analysis:<br>• Review of quantitative administrative data, particularly measures captured in LEC's new Information Management System (IMS) funded by the WB. The evaluator will explore measures that demonstrate the quality of implementation of Activities 1 and 2, including key indicators of efforts to improve the productivity, functionality, and performance of infrastructure, the utility, and the energy sector's market structure, governance, and regulation<br>• Review of project documents, including work plans, progress, annual and monitoring and evaluation (M&E) reports, as well as relevant media and news, and other important documents<br>• Qualitative interviews of key informants and sector stakeholders with specific knowledge of implementation activities<br>• Focus group discussions (FGDs) with staff (non-leadership roles) at implementing organizations<br>• Site visits to observe and expand understanding of infrastructure, operations, and implementation that cannot be captured in written documents; presents an opportunity to ask more in-depth and relevant questions and inform future evaluation activities<br>• Tracking implementation of Compact activities and sub-activities; complementary or contradictory interventions; relevant political events, economic shifts, energy pricing, and the contemporary societal context that affects implementation and the energy sector<br>• Tracking the development, passage, and implementation of policies, laws, and regulations throughout the energy sector |
| 4. To what extent, if any, does comparing the assumptions made in the forecasted economic model, actual program implementation, and evaluation findings generate lessons that can be applied to future economic models? | Cost-benefit analysis<br>An analysis of the ERR model, along with suggested revisions and justification as warranted |

| Grid-level research questions and outcomes | Evaluation design, methods, and key indicators |
|---|---|
| 1. To what extent, if any, has increased electricity generation contributed to increased reliability of Liberia's electricity supply, such as a reduction in planned and unplanned outages and improved voltage stability?<br>2. To what extent has capacity strengthening and sector reform improved LEC's operations and maintenance of the grid, so that increased generation leads to reduced outages and voltage stability?<br>3. To what extent, if any, have energy sector reform activities contributed to improvements in electricity regulation, policy formulation, and monitoring? How sustainable are these improvements? | Performance evaluation, which will integrate and triangulate data from multiple sources: *Note that analyses from the document and energy sector policy review, and qualitative interviews will be mapped to repeated measures of indicators of power production, T&D, and consumption to fully understand processes and mechanisms driving outcomes.*<br>• Longitudinal analyses of repeated quantitative measures to assess indicators such as electricity generation, transmission, distribution, load factor, power availability, voltage stability and outages, consumption, number of customers, un-served demand, peak demand shortage, and transformer and overhead line failure rates<br>• Review of documents and reports, as well as relevant media and news, that provide insights into (1) grid-level changes and (2) LEC's and the MSC's operations related to grid operations and maintenance<br>• Qualitative key informant and stakeholder interviews, during which the evaluator will pose questions focused on a SWOT analysis of capacity strengthening and sector reform activities that facilitate or inhibit grid improvements, operations, and maintenance<br>• Review of energy sector policies, laws, and regulations, and other evidence of activities affecting grid improvements |

| Energy sector research question and outcomes | Evaluation design, methods, and key indicators |
|---|---|
| 1. What effect, if any, have LERC activities to regulate the legal, economic, and technical environment, or changes in the availability and reliability of electricity, had on IPPs operations?<br>2. What new energy policies, laws, and legal, economic, and technical regulations have been enacted or adopted, given the LERC's activities and support from the donor community? How have these contributed to modernizing the energy sector and making the sector financially viable? | Performance evaluation which will integrate and triangulate data from multiple sources:<br>• Longitudinal analyses of repeated quantitative measures using administrative data, including indicators of power generation, T&D, and consumption, as well as electricity purchased from IPPs, and the role, type, and size of IPPs. Further, the evaluator will track tariff rates across user types<br>• Review and tracing of documents and reports, energy sector policies, laws, and regulations and evidence of other sector reform activities that aim to optimize electricity consumption, quality of supply, prices, and financial performance, and capacity and maintenance, which will be mapped to an event timeline to inform the interplay between changes and effects; Also review of relevant media and news, that provide insights into (1) LERC's activities around legal, economic, and technical regulations, including the process and dates of the introduction, passage, and implementation of regulations and laws; and (2) activities and events leading to the modernization of the energy sector, the market structure, and sector governance and performance.<br>• Qualitative key informant and stakeholder interviews, with questions focused on understanding facilitators and barriers to LERC devising and adopting the policies, laws, and regulations that modernize the energy sector and improve the utility's financial standing. Also focus on perceptions of LERC's credibility, legitimacy, transparency, independence, accountability, and ability to set tariffs. Respondents will also include interviews with IPPs to understand their role, type, size, number, and experience with power production and sales. |

| End-user research questions, outcomes, and impacts | Evaluation design, methods, and key indicators |
|---|---|

| | |
|---|---|
| 1. To what extent, if any, have the Mt. Coffee Rehabilitation and Energy Sector Reform Activities affected the number of users connecting to the grid and the demand for electricity?<br>2. To what extent do customers invest in energy-intensive appliances or equipment? What is the effect of energy on time use (household production, leisure, school work, and employment)? What, if any, are the spillover effects on non-electrified households? How do all of these impacts vary by differences in gender, socioeconomic status, and other demographic characteristics?<br>3. How did new households, commercial, industrial, and other consumers decide to connect? For potential consumers, why have they not connected? What barriers do potential customers face when trying to connect to the grid? How have changes in the reliability of electricity affected connected and unconnected households' perceptions of the quality of electricity? Are there differences in these issues by respondents' gender and socioeconomic status? | Performance evaluation which will integrate and triangulate data from multiple sources:<br>• Longitudinal analyses of repeated quantitative measures of administrative data; measures include the number of customers and new applications, wait time for applicants, electricity consumption, total energy sold, and measures of customer satisfaction with LEC<br>• Review of documents, reports, and media that provide insights into how Activities 1 and 2 have affected new connections<br>• Stakeholder interviews with commercial, industrial, public sector, and other consumers selected to represent a range of enterprise types and sizes to investigate decisions to connect, barriers to connecting, perceptions of electricity quality, and energy-related behaviors, such as changes in consumption, new purchases and services, and productivity<br>• FGDs with connected and unconnected households and small enterprises to investigate decisions to connect, barriers to connecting, and energy-related behaviors, such as changes in consumption, new purchases, productivity and time use, and potential spillover effects |

| **Utility-level research questions and outcomes** | **Evaluation design and methods** |
|---|---|
| 1. How has the electricity tariff changed since MCHPP was rehabilitated? To what extent does it cover the costs of electricity generation and other operating costs?<br>2. To what extent, if any, has LEC's management improved since the new management contract became effective? What progress has the GoL made toward establishing a longer-term management arrangement for LEC?<br>3. How sustainable is LEC as a utility? What are the biggest barriers to its sustainability? | Performance evaluation which will integrate and triangulate data from multiple sources:<br>• Longitudinal analyses of measures using administrative data on indicators such as tariff rates across user types, energy forecasts, and mismatch between demand, load, and forecast, peak demand shortage, transformer and overhead line failure rates, customer pay rates, collection rates, response to supply and meter complaints, generation unit cost, staff productivity index, energy lost, and other priority indicators. Data will be aligned with ESBI's key performance indicators.<br>• Analysis of LEC management using indicator tracking, analysis of work plans, comparing plans with actual activities, systems, and processes; review of M&E reports, annual reports<br>• Qualitative key informant and stakeholder interviews, with questions focused on LEC's management and operations, including the MSC's efforts to bolster LEC's functionality and effectiveness as a utility and the sustainability of plans, processes, data, and other systems |

The following key outcomes will be included in those measured through the evaluation:

**Table 6: Energy Project Key Outcomes**

| Program Logic Result | Indicator | Definition | Unit | Baseline | Target | Target Date[24] |
|---|---|---|---|---|---|---|

[24] Although the target date is indicated as 2021, the original economic analysis anticipated these targets being achieved by 2017.

| | | | | | | |
|---|---|---|---|---|---|---|
| Decreased user costs | Cost savings to existing customers | Cost savings experienced by current LEC customers as a percentage of original electricity costs | Percentage | 0 | 58 | 2021 |
| Decreased user costs | Cost savings for new industrial connections | Cost savings experienced by new industrial customers as a percentage of original electricity costs | Percentage | 0 | 47 | 2021 |
| Decreased user costs | Cost savings for new commercial connections | Cost savings experienced by new commercial customers as a percentage of original electricity costs | Percentage | 0 | 58 | 2021 |

***Data Sources***

Two types of data will be used in the evaluation: primary data collected specifically for the evaluation and secondary data, such as administrative data, which already exists.

**Table 7: Energy Project Primary Data Collection**

| Survey Name | Quantitative or Qualitative | Define Sample | Sample Size | Number of Rounds | Exposure Period (months) | Expected Dates of Primary Data Collection |
|---|---|---|---|---|---|---|
| Document review | Qualitative | N/A | N/A | Continuous | The exposure period varies based on the activity and outcomes of interest | Regularly throughout evaluation |
| Interviews with key informants and stakeholder | Qualitative | MCHPP<br>MME, LERC<br>LEC, CMC<br>MCC, MCA, EU, KfW, NORAD, Power Africa, WB<br>IPPs, CIE | 2<br>4-6<br>4-6<br>10+<br>4-6 | 2-5[1] | Grid outcomes:<br>• 1 – 3 years<br>Energy sector:<br>• 12 – 48 months<br>Utility outcomes:<br>6 - 24 months | 10/2018-11/2019 and annually thereafter |
| Interviews with end-users<br><br>Focus group discussions with end-users | Qualitative | Enterprises of various sizes<br><br>Public sector<br><br>Households and small enterprises | 10<br><br>10<br>10, with 8-10 FGD participants | 3 | 12 - 48 | Baseline: 8/2019<br>Midline: 8/2021-10/2021<br>Endline: 8/2023-10/2023 |
| Site visits | Qualitative | MCHPP and substation<br><br>T&D infrastructure | TBD | 3 | For infrastructure related outcomes: 12 months – 3 years<br>For utility related outcomes: 6 - 12 months | Baseline: 9/2018-11/2019<br>Midline: 9/2020-11/2021<br>Endline: 10/2022-11/2023 |
| Administrative data from LEC, LERC, MME | Quantitative | N/A | N/A | Continuous | 6 - 12 | Monthly |
| Small end user listing (households and small businesses) | Quantitative | Connected EAs in Monrovia | All households/businesses in 30 EAs<br><br>All households/b | 1 | 12 - 24 | Baseline:<br>• Connected 9/2018<br>Unconnected 4/2019-5/2019 |

[1] It is possible to collect data more often than once a year dependent on key milestones and events.

| Survey Name | Quantitative or Qualitative | Define Sample | Sample Size | Number of Rounds | Exposure Period (months) | Expected Dates of Primary Data Collection |
|---|---|---|---|---|---|---|
| | | Unconnected communities in Greater Monrovia | usinesses in ~125 EAs | | | |
| Community survey | Quantitative | Connected end users in Monrovia<br><br>Unconnected small end users in Greater Monrovia | 30 communities<br><br>25 communities | 3 | 12 - 24 | Baseline:<br>• Connected: 9/2018<br>• Unconnected: 4/2019-5/2019<br>Midline:<br>• Connected: 10/2020-12/2020<br>• Unconnected: 4/2021-5/2021<br>Endline:<br>• Connected: 10/2023<br>Unconnected: 11/2023 |
| Household and small enterprise survey | Quantitative | Connected small end users in Monrovia<br><br>Unconnected small end users in Greater Monrovia | 1,500<br><br>1300 | 3 | 12 - 24 | Baseline:<br>• Connected: 9/2018-12/2018<br>• Unconnected: 5/2019-6/2019<br>Midline:<br>• Connected: 10/2020-12/2020<br>• Unconnected: 5/2021-6/2021<br>Endline:<br>• Connected: 10/2023-12/2023<br>Unconnected: 12/2023-2/2024 |
| Enterprise survey<br><br>Public institution survey | Quantitative | Medium and large businesses and public institutions in Monrovia | 200-300 | 3 | 12 - 24 | Baseline:<br>• Connected: 9/2018-12/2018<br>• Unconnected: 5/2019-6/2019<br>Midline: |

| Survey Name | Quantitative or Qualitative | Define Sample | Sample Size | Number of Rounds | Exposure Period (months) | Expected Dates of Primary Data Collection |
|---|---|---|---|---|---|---|
| | | | | | | • Connected: 10/2020-12/2020<br>• Unconnected: 5/2021-6/2021<br>Endline:<br>• Connected: 10/2023-12/2023<br>Unconnected: 12/2023-2/2024 |

Existing Data

- LEC Administrative Data
- Other secondary data

***Summary of Activities or Sub-Activities without Evaluations***

Evaluation designs for the Mt. Coffee Support and LEC Training Center Activities are under review currently; evaluation questions are presented below. Results of the GSI interventions will be measured as a part of the Mt. Coffee Rehabilitation and Energy Sector Reform evaluation.

*Mt. Coffee Support Activity*

1. Did implementation of the White Plains Pipeline go according to plan?
2. To what extent, if any, has the water transmission line increased the supply of water to the White Plains facility, improved water quality, and reduced risks associated with salt-water intrusion, sediment and other impurities?
3. Has the new pipeline design led to a reduction in operating costs now that water is gravity fed at no cost?
4. What is the status of the existing water network? To what extent can it accommodate the increased supply? Will the WPP limit the ability of LWSC to meet a growing demand for water?
5. What is the cost benefit analysis of the pipeline? (Recalculation and justification)
6. How sustainable are the results of the Mt. Coffee Support Activity?

*LEC Training Center Activity*

1. How is the LEC Training Center functioning in practice? How effective is the LEC Training Center Activity at training LEC staff?

2. To what extent is the LEC Training Center meeting skill needs at LEC both in terms of the number of people trained and the quality and relevance of skills provided? Is there content that the training center can manage as opposed to training that must obtained abroad?

3. How sustainable is the LEC Training Center? Do LEC staff have the time and capacity to operate the training center? Are new LEC staff offered training and how does LEC manage skill and capacity continuity?

4. Was the LEC Training Center business plan sound and was the activity launched in time for processes to be sustainable?

*GSI Investments*

1. Were enterprises, especially those owned by women, able to connect to grid electricity?

2. To what extent, if any, do female and youth customers report increased satisfaction with LEC service? What explains those changes?

**Roads Project Evaluation**

MCC developed a Principles into Practice paper based on a review of its early investments and evaluations in the transport sector, which includes a set of lessons for improving our transport practice going forward for both project design and evaluation design. In particular, this review has highlighted the importance of understanding the program logic of the investment before designing an evaluation, collecting updated high quality data, as well as ensuring that the benefit of the evaluation is greater than its cost. With these lessons in mind, MCC has contracted an independent evaluator to assess the performance of the road maintenance regime resulting from the National Road Maintenance and Road Sector Reform Activities.

***Evaluation Questions***

1. To what extent did the project have a clear plan? Was it implemented according to plan?

*Engineering Analysis and Economic Model*

1. What is the economic return of the road maintenance investments? What factors drove changes to the ERRs over time? How could the project have been designed to result in a higher ERR?

*Maintenance*

1. What are the relevant road authority's maintenance practices? How have these changed since the beginning of the Compact?

2. Objective Question (Main Evaluation Question): How were routine, periodic and emergency maintenance works planned and executed by the Government before the Compact and how are they planned and executed after the Compact? Did planning and execution of routine, periodic and emergency road maintenance improve?
    a. Did the improved planning and execution of road maintenance result in maintenance cost savings?
    b. How does the execution of road maintenance compare to the GoL's maintenance plans?
    c. If maintenance is carried out using the improved methods implemented by MCC using HDM-4 and cost savings result, are cost savings returned to the Government of Liberia, or are the added available funds used to carry out further maintenance?
    d. What is the role of the private sector in the new maintenance regime and how does this compare to the role envisioned for it under the Project?
    e. The established procedure put in place by the program includes, (1) Data collection, (2) Data analysis, (3) Planning, (4) NRF Approval of planned prioritized MPW works, (5) Allocation of funding by NRF, (6) Timely award of road maintenance contracts, and (7) Execution. The success of this program going forward depends on continuing this process. How likely is it post-compact that Government will perpetuate this cycle? What, if anything, could MCC have done differently to ensure this cycle would last longer?
    f. How sustainable is the new maintenance regime? Volpe's assistance is currently slated to end at the end of July 2019. After that, Volpe will only be assisting with RAMS, but won't be helping MPW with HDM-4, data collection, etc. Sustainability activities could continue Volpe's assistance for one more cycle. Can GoL continue to use the system on their own? Why? If not, what could MCC have done differently to ensure the GoL would continue to use the system on their own?
    g. Does the overall quality of the road network improve, as a result of MCC's investments in maintenance planning and execution?

3. What organizational, political, and economic factors are shaping road maintenance decisions and practices in Liberia?
    a. How is road maintenance regulated?
    b. How and to what extent did the Compact help to clarify and strengthen governance and regulatory arrangements for road maintenance?
    c. How is road maintenance funded and how does this compare to funding needs and projections?
    d. How did this change from before the MCC intervention to after?
    e. What evidence is there that MCC facilitated those changes (if relevant)?
    f. Are there factors influencing road transport agencies' policies and practices that could have been addressed by MCC to improve investment outcomes? What are these factors, and how should they be assessed during project design?
    g. Are the funds in the Road Fund being used to maintain the road network?

Optional: *Road Usage Patterns*

1. Have road usage patterns changed, in terms of who is traveling on the roads, why, what they are transporting, what they are paying for transport, and how long it takes to move along key routes? Previous scopes of work for MCC road evaluations have separated Research Question 3 into two parts because they were being contracted only for endline data collection and analysis. Since this contract is being signed before project implementation, there is no need to separate the research question into two parts.

Optional: *Transportation Market Structure*

1. Given the existing transportation market structure, what portion of VOC savings will be passed on to consumers of transportation services? If not all savings are passed on, could this project have cost effectively addressed these inefficiencies? How? How is the transportation market structured and what is the likelihood that VOC savings will be passed on to consumers of transportation services? Did this change from before the MCC intervention to after? What evidence is there that MCC facilitated those changes (if relevant)?

***Evaluation Methodology Description***

The evaluation of the Roads Project should explore the short-term and intermediate outcomes in the program logic and the role of critical assumptions.

The methodology for the evaluation has not been determined yet, but it will likely include before-after comparisons of key outcomes, with key informant interviews to understand why certain results did or did not occur.

The following key outcomes will be included in those measured through the evaluation:

**Table 8. Roads Project Key Outcomes**

| Result | Indicator |
|---|---|
| Improved quality and prolonged life of road network | Roughness |
| Decreased vehicle operating costs | Vehicle operating costs on maintained roads |
| Decreased travel time | Travel time on maintained roads |

The exposure period (the period of time between project completion and final data collection) will be between 12 and 24 months.

***Data Sources***

Two types of data will be used in the evaluation: primary data collected specifically for the evaluation and secondary data, such as administrative data, which already exists.

**Table 9: Roads Project Primary Data Collection**

| Survey Name | Quantitative or Qualitative | Define Sample | Sample Size | Number of Rounds | Exposure Period (months) | Expected Dates of Primary Data Collection |
|---|---|---|---|---|---|---|
| TBD | TBD | TBD | TBD | TBD | TBD | Baseline: (2020) Endline: (2022-2023) |

Existing Data

- MPW Administrative Data
- NRF Administrative Data
- Other secondary data

# IMPLEMENTATION AND MANAGEMENT OF M&E

## Responsibilities

### MCA-L M&E Unit

The MCA-L M&E Unit will be part of the MCA Management Team, and will be composed of an M&E Director who will have the key responsibility of leading and managing all M&E activities and an M&E Manager who will support the M&E Director in performing the M&E activities. Additionally, the M&E Unit will hire short-term support on an as-needed basis. The M&E Unit will carry out, or hire contractors to complete the following and other related activities:

- Direct implementation of all activities laid out in the M&E Plan and ensure all requirements of the M&E Plan are met by MCA-L and reporting entities;
- Ensure that the M&E Plan is modified and updated as improved information becomes available;
- Oversee development and execution of an M&E system (including data-collection, data analysis and reporting systems) integrated with the MCC Management Information System (MIS);
- Elaborate and document M&E Policies, Procedures and Processes in an M&E Manual or other format, to be used by all MCA-L staff and project implementers;
- Communicate the M&E Plan and explain the M&E system to all key stakeholders involved in the Compact, particularly project implementers (including the MCHPP PIU), to ensure a common understanding by all. This could take the form of orientation and capacity building sessions or ongoing coordination efforts, and could focus on issues such as:
    - Explaining indicator definitions, data collection methods, and timing/frequency of data collection and reporting,
    - Data quality controls and verification procedures,
    - Evaluation questions and methodology, etc.;
- Develop and use a documentation system to ensure that key M&E actions, processes and deliverables are systematically recorded. This may be accomplished either as part of the M&E information system or independently. The documentation may encompass the following elements:
    - Indicators and material evidence for reported values,
    - M&E Plan versions,
    - Reporting manuals and templates,
    - Key M&E deliverables including TORs, contracts/agreements, data collection instruments, reports/analyses, etc.;
- Develop (with the MCA-L Communications/Outreach Unit and Environmental and Social Performance (ESP), and Gender and Social Inclusion (GSI)/Social and Gender Assessment (SGA) officers) and implement a systematic results dissemination approach that draws on verified ITT data to ensure participation of all stakeholders, and to facilitate feedback of lessons learned into the Compact implementation process;

- Organize and oversee regular independent data quality reviews on a periodic basis to assess the quality of data reported to MCA-L;
- Participate in project monitoring through site visits, review of project reports and analysis of performance monitoring and other data;
- Update the M&E work plan periodically;
- Manage the M&E budget efficiently;
- Contribute to the design of the evaluation strategy;
- Collaborate with the Procurement Director to prepare and conduct procurement of M&E contracts;
- Ensure that data collection mechanisms are designed to collect data disaggregated by gender, income category, age, and other dimensions, as applicable and practical, and that the findings are presented at the appropriately disaggregated level;
- As the champion of results based management, the M&E Unit will take steps to foster a results oriented culture throughout MCA-L and its implementing partners – this includes making sure that M&E information is used by the MCA management and project teams to improve Compact performance (feedback loop).
- Ensure data collection, storage, and dissemination activities maximize protection of confidentiality of survey respondents' personally identifiable information. This may require:
    - Facilitating local Institutional Review Board clearance for data collection,
    - Using lock and key cabinets for paper files,
    - Using secure file transfer systems,
    - Encrypting data files,
    - Employing password protection on data systems and data encryption,
    - Requiring signed acknowledgements of roles and responsibilities,
    - Requiring relevant stakeholders to sign non-disclosure agreements, and
    - Incorporating data protection standards into the organization's records management procedures, or if necessary, developing a records management procedure that includes such standards for any data collection managed by MCA-L.

The M&E Director will be a part of MCA-L's internal Management Unit, composed from MCA leadership, Project Directors and other Directors. The M&E Director will report directly to the MCA-L CEO and maintain close cooperation with Project Directors. Collaboration with the procurement team will be very important to prepare and conduct timely procurement of M&E related contracts as well as ensuring that other implementation contracts contain necessary data reporting provisions.

Seminars, workshops, elaboration and distribution and dissemination of M&E materials shall be conducted in close cooperation with the MCA-L Communications/Outreach Unit.

In order to prepare for post Compact monitoring by the Government, the MCA-L M&E Unit should identify a post Compact point of contact (POC) for MCC early on in the program and work with that POC to build understanding of the MCC program and monitoring process. This POC should be part of the Government entity that will commit to continuing M&E of Compact investments after the Compact End Date. The M&E Unit should also identify the team that will be responsible for reviewing evaluation reports that are delivered post Compact (e.g., project

leads), to ensure that the relevant project stakeholders review and provide feedback prior to the publication of final reports.

***Monitoring and Evaluation (M&E) Director***

The M&E Director shall be responsible for the overall M&E strategy and review of Compact implementation. The Director will also act as an advisor to the CEO and MCA-L Senior Management. The Director shall periodically measure, report and communicate (in collaboration with the Communications/Outreach Unit) the performance and results of the Compact, which will inform implementation decisions and help the Compact achieve its objectives. The Director will also analyze the overall program execution, covering both financial and physical implementation and monitoring key assumptions and risks made in the ERR calculations for the program.

***Monitoring and Evaluation Manager***

The Monitoring and Evaluation Manager shall assist in the full range of M&E activities, including day to day monitoring and analysis, and providing timely and relevant information to key project stakeholders.

**Coordination**

***MCA- L Data Management System for Monitoring and Evaluation***

All MCAs must use the MCC MIS for reporting the QDRP (including the ITT) to MCC. In addition, an MCA may decide to develop its own MIS for M&E to collect data from implementers that can track program progress and monitor each Activity to facilitate timely and accurate reporting. However, any MIS development must be coordinated closely with both the MCC MIS and MCA MIS initiatives, other service providers, and government ministries.

***Review and Revision of the M&E Plan***

The M&E Plan is designed to evolve over time, adjusting to changes in program activities and improvements in performance monitoring and measurement. The M&E Plan may be modified or amended without amending the Compact. However, any such modification or amendment of the M&E Plan by MCA-L must be approved by MCC in writing and must be otherwise consistent with the requirements of the Compact and any relevant supplemental agreements. With notice to MCA-L, MCC may make non-substantive changes to the M&E Plan as necessary. Some examples of non-substantive changes could include revising units to correspond to MCC's approved list of units of measurement or standardizing indicator names.

***Timing and Frequency of Reviews and Modifications***

In the fourth quarter of every Compact year, starting in calendar year 2019, or as necessary, the M&E Director of MCA-L and representatives of MCC M&E staff will review how well the M&E Plan has met its objectives (i.e., an "Annual Review"). The Annual Review is intended to ensure that the M&E Plan measures program performance accurately and provides crucial information on the need for changes in project design. More specifically, the review:

- Ensures that the M&E Plan shows whether the logical sequence of intervention outputs and outcomes is occurring;
- Checks whether indicator definitions are precise and timely;

- Checks whether M&E indicators accurately reflect program performance;
- Updates indicator targets, as allowed by the MCC M&E Policy; and
- Adds indicators, as needed, to track hitherto unmeasured results.

The M&E Plan will be revised by MCA-L, in agreement with MCC M&E, when the need for change has been identified in an Annual Review. The revision and approval process will follow the guidelines outlines in the MCC M&E Policy.

The Annual Reviews will adhere to the following schedule; however, the M&E Plan may be reviewed and modified at other times, e.g., as Compact investments are further defined:

**Table 10: Schedule for Annual Reviews**

| Compact Year | Timing of Annual Review |
|---|---|
| 4 | October-December 2019 |
| 5 | October-December 2020 |

***Documenting Modifications***

Justification for deleting an indicator, modifying an indicator baseline or target, modifying Beneficiary information or major adjustments to the evaluation plan will be adequately documented in English in Annex III to the revised M&E Plan. MCA-L shall use the standard modification template provided by MCC for documenting these modifications.

***Approval and Peer Review of M&E Plan Modifications***

All M&E Plan modifications made by the MCA-L will be submitted to MCC for formal approval. The M&E Plan may undergo peer review within MCC before the beginning of the formal approval process. Before requesting MCC approval, changes to the M&E Plan shall be approved by the MCA-L Board of Directors if they are considered substantial, as determined by MCA-L and MCC.

# M&E BUDGET

The budget for the implementation of the proposed M&E activities for the five-year term of the Compact is US$ 5.5 million. The line items of this budget will be reviewed and updated as the program develops, on an annual or quarterly basis, when the respective quarterly detailed financial plan is submitted to MCC with the quarterly disbursement request.

The M&E budget does not include the M&E staff in the MCA-L Management Unit whose salaries and field trips are included in the administrative budget of the Compact. The budget should not exceed the total amount over the five years, but the distribution of funding between line items and years may be adjusted according to the results of the M&E Plan's annual or quarterly reviews, if needed.

While the resources for carrying-out surveys during Compact implementation are allocated by MCA-L using Compact funds, the evaluation design and analysis is funded directly by MCC.

MCC has budgeted approximately $5,000,000 to fund the external evaluators and the initial data quality review.

**Table 11: Estimated Compact M&E Budget**

| Item | Total |
|---|---|
| Monitoring Oversight | $1,050,000 |
| Capacity Building for M&E | $450,000 |
| Surveys | $3,500,000 |
| MCA Process Evaluations | $500,000 |
| **Total** | **$5,500,000** |

# OTHER

## M&E Work Plan

The MCA-L M&E Directorate shall develop an M&E work plan based on the proposed activities in the M&E budget. This work plan shall be for the whole duration of the Compact five year period. The main activities shall include the procurement of consultant services, procurement of monitoring equipment, if necessary, and software, stakeholder workshops, data collection and analysis, and procurement and implementation of surveys. The M&E work plan will be developed and available within the second quarter of Compact implementation, and updated at least annually.

# ANNEX I: INDICATOR DOCUMENTATION TABLE

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Energy Project** | | | | | | | | | |
| Increased lower cost generation | P-15 | Outcome | Total electricity supply | Total electricity, in megawatt hours, produced or imported in a year. | Megawatt hours | Electricity supply source | LEC Quarterly Reports | LEC Generation | Quarterly | The categories for the disaggregation "Electricity supply source" are: Domestic (P-15.1) and Imports (P-15.2). Liberia currently imports a small amount of energy from Cote d'Ivoire to serve communities in three border counties. Unfortunately, this energy is not well documented by LEC. Once that information is more readily available, and once energy is being imported from CLSG, we will determine a way to incorporate that reporting. The baseline value differs from those used in the original and revised CBA models (i.e., original model: 54,860; revised model: 71,574). The baseline value used in the M&E Plan is based on LEC data as of December 2015, while the baseline value used in the original CBA is based on the 2014 Least Cost Power Development Plan. |
| Increased lower cost generation | P-15 | Outcome | Total electricity supply – revised CBA | Total electricity, in megawatt hours, produced or imported in a year. | Megawatt hours | Electricity supply source | LEC Quarterly Reports | LEC Generation | Quarterly | The categories for the disaggregation "Electricity supply source" are: Domestic (P-15.1) and Imports (P-15.2). Liberia currently imports a |

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | small amount of energy from Cote d'Ivoire to serve communities in three border counties. Unfortunately, this energy is not well documented by LEC. Once that information is more readily available, and once energy is being imported from CLSG, we will determine a way to incorporate that reporting. The baseline value differs from those used in the original and revised CBA models (i.e., original model: 54,860; revised model: 71,574). The baseline value used in the M&E Plan is based on LEC data as of December 2015, while the baseline value used in the original CBA is based on the 2014 Least Cost Power Development Plan. |
| Increased consumption of electricity, increased revenue | P-23 | Outcome | Total electricity sold | The total megawatt hours of electricity sales to all customer types. | Megawatt hours | Tariff class | LEC Quarterly Reports | LEC | Quarterly | The categories for the disaggregation "Tariff class" are: Residential (P-23.1); Commercial (P-23.2); Industrial (P-23.3); Government; and Other. |
| Increased consumption of electricity, increased revenue | P-23 | Outcome | Total elecitricity sold – revised CBA | The total megawatt hours of electricity sales to all customer types. | Megawatt hours | Tariff class | LEC Quarterly Reports | LEC | Quarterly | The categories for the disaggregation "Tariff class" are: Residential (P-23.1); Commercial (P-23.2); Industrial (P-23.3); Government; and Other. |
| Increased customer base | P-25 | Outcome | Percentage of households connected to the national grid | Number of households that have access to a legal connection to electricity service from an electrical | Percentage | | LEC Quarterly Reports and LCPDP | LEC, MCA-L | Annual | |

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | utility or service provider / Total number of households in the country. | | | | | | |
| Increased customer base | P-25.1 | Outcome | Households that have access to a legal connection to electricity service from an electrical utility or service provider | Number of households that have access to a legal connection to electricity service from an electrical utility or service provider. | Number | | LEC Quarterly Reports | LEC | Annual | This indicator assumes that each residential connection reported by LEC represents one household. |
| Increased customer base | P-25.2 | Outcome | Total number of households in the country | Total number of households in the country. | Number | | LCPDP | MCA-L | Annual | In the absence of a means to track annual changes in the number of households, the projections from the LCPDP on page 5-8 (i.e., targets for this indicator) will be treated as actuals in Compact reporting. |
| Increased customer base | | Outcome | Customers connected to the grid | Number of customers that have a legal connection to electricity service from LEC | Number | Customer class, customer phase | LEC Quarterly Reports | LEC | Quarterly | The baseline value is higher than the baseline value used in the CBA model (i.e., 13,599). The former is based on LEC data as of December 2015, while the latter is based on the number of LEC customers documented in the 2014 Least Cost Power Development Plan. |
| Increased customer base | | Outcome | Cusomers connected to the grid – revised CBA | Number of customers that have a legal connection to electricity service from LEC | Number | Customer class, customer phase | LEC Quarterly Reports | LEC | Quarterly | The baseline value is higher than the baseline value used in the CBA model (i.e., 13,599). The former is based on LEC data as of December 2015, while the latter is based on the number of LEC customers documented in the 2014 Least Cost Power Development Plan. |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Increased quality and reliability of electricity | | Outcome | System Average Interruption Frequency Index (SAIFI) | Sum of all customer interruption durations / Total number of customers | Rate | | LEC Quarterly Reports | LEC | Annual | SAIFI is only counted at the 22kV level and above; the number of customers associated with each feeder is estimated and is likely an underestimate.<br><br>This indicator will aggregate the monthly index values to report the quarterly and annual totals. |
| Increased quality and reliability of electricity | | Outcome | System Average Interruption Duration Index (SAIDI) | Sum of durations, in customer-hours, of all customer interruptions in a year / Total number of customers connected to network in the same year | Hours | | LEC Quarterly Reports | LEC | Annual | SAIDI is only counted at the 22kV level and above; the number of customers associated with each feeder is estimated and is likely an underestimate.<br><br>This indicator will aggregate the monthly index values to report the quarterly and annual totals. |
| Increased quality and reliability of electricity | | Outcome | Adequacy of supply | The minimum value in a quarter of the following: total dependable capacity available from all power plants in a month divided by peak daily demand in the corresponding month | Rate | | LEC Quarterly Reports | LEC | Quarterly | |
| Increased quality and reliability of electricity | | Outcome | Available power plant generation capacity | Total dependable capacity available from all power plants in the month with the lowest calculated adequacy of supply | Megawatts | | LEC Quarterly Reports | LEC | Quarterly | Formula: available power plant generation capacity in a month = power plant dependable capacity (MW) * hours plant was available at that capacity during month / hours in month |
| Increased quality and reliability of electricity, increased consumption of electricity | | Outcome | Peak demand | Daily peak demand for on-grid power in the month with the lowest calculated adequacy of supply | Megawatts | | LEC Quarterly Reports | LEC | Quarterly | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Improved plant facilities | P-16 | Outcome | Power plant availability | Unweighted average across all power plants of the following: total number of hours per quarter that a plant is able and available to produce electricity / Total number of hours in the same quarter. | Percentage | Liberia power plants | LEC Quarterly Reports | LEC | Quarterly | Targets will not be established for this indicator because it aggregates values that do not reflect Compact performance directly and for which LEC does not have operational targets.<br><br>The categories for the disaggregation "Liberia power plants" are: Mt. Coffee, HFO, and Diesel generators. |
| Reduced tariffs, Cost-reflective tariff in place | | Outcome | Electricity tariff | Average tariff per kilowatt-hour | US Dollars | Customer class | Tariff documentation from LEC Board | LEC | Quarterly | LEC does not currently differentiate between customer classes but plans to introduce a new tariff regime eventually. The "average" tariff will be the weighted average of different classes based on consumption amount and number of customers. |
| **Mt. Coffee Rehabilitation Activity** | | | | | | | | | | |
| Increased lower cost generation | P-26 | Outcome | Share of renewable energy in the country | Total installed generation capacity of on- or off-grid renewable energy, in megawatts / Total installed generation capacity (P-17). | Percentage | | LEC Quarterly Reports | LEC | Quarterly | Given significant unknowns about private off-grid generation capacity, this indicator will only report on on-grid capacity. |
| Mt. Coffee infrastructure rehabilitated | P-17 | Outcome | Installed generation capacity | Total generation capacity, in megawatts, installed plants can generate within the country. | Megawatts | Power generation source | LEC Quarterly reports | LEC | Quarterly | Given significant unknowns about private off-grid generation capacity, this indicator will only report on on-grid capacity. |
| Increased lower cost generation | | Outcome | Mt. Coffee Hydropower Plant Capacity Factor | The ratio of the energy (MWh) generated by MCHPP in one year to the energy that it could have produced at continuous full power operation over the same period | Percentage | | LEC Quarterly Reports | LEC | Annual | Formula: Annual electricity generated by Mt. Coffee (MWh)/installed capacity (88 MW) * (24 hours/day) * 365 days, i.e., Annual electricity generated by Mt. |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Coffee (MWh)/752,960 MWh |
| Increased lower cost generation | | Outcome | Percentage of electricity supplied by Mt. Coffee Hydropower Plant | Total electricity, in megawatt hours, produced by MCHPP in a quarter / Total electricity, in megawatt hours, produced or imported in a quarter for supply to the grid | Percentage | | LEC Quarterly Reports | LEC | Quarterly | |
| Increased lower cost generation | | Outcome | Percentage of electricity supplied by Mt. Coffee Hydropower Plant – revised CBA | Total electricity, in megawatt hours, produced by MCHPP in a quarter / Total electricity, in megawatt hours, produced or imported in a quarter for supply to the grid | Percentage | | LEC Quarterly Reports | LEC | Quarterly | |
| Mt. Coffee infrastructure rehabilitated | P-6 | Output | Generation capacity added | Generation capacity added, measured in megawatts, resulting from construction of new generating capacity or reconstruction, rehabilitation, or upgrading of existing generating capacity funded with MCC support. | Megawatts | Power generation source | PIU Quarterly Reports | PIU | Quarterly | This indicator is only referring to generation capacity from MCHPP.<br><br>The disaggregation “Power generation source” is included for tracking purposes only and all generation capacity is considered on-grid (P-6.1). |
| Mt. Coffee infrastructure rehabilitated | P-9 | Output | Transmission substation capacity added | The total added transmission substation capacity, measured in mega volt amperes, that is energized, commissioned, and accompanied by a test report and supervising engineer’s certification resulting from new construction or refurbishment of existing substations that is due to MCC support. | Megavolt ampere | | PIU Quarterly Reports | PIU | Quarterly | This indicator is only referring to transmission substation capacity from MCHPP. |
| Mt. Coffee infrastructure rehabilitated | P- 7 | Output | Kilometers of transmission lines upgraded or built | The sum of linear kilometers of new, reconstructed, rehabilitated, or upgraded transmission lines that have been energized, tested and commissioned with MCC support. | Kilometers | | PIU Quarterly Reports | PIU | Quarterly | |
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | | Process | Percent disbursed for Mt. Coffee Hydropower Plant rehabilitation | The total amount disbursed for MCHPP rehabilitation divided by the total current amount allocated for MCHPP rehabilitation | Percentage | | PIU Quarterly Reports | PIU | Quarterly | This indicator reflects pooled donor funding |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | | Process | Total amount allocated for Mt. Coffee Hydropower Plant rehabilitation | The total value of all signed construction contracts and funding allocated for oversight, environmental and social mitigation, initial operations and maintenance, and contingencies for MCHPP rehabilitation | US Dollars | | PIU Quarterly Reports | PIU | Quarterly | This indicator reflects pooled donor funding |
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | | Process | Value disbursed for Mt. Coffee Hydropower Plant rehabilitation | The amount disbursed for MCHPP rehabilitation, including costs associated with construction, oversight, environmental and social mitigation, initial operations and maintenance, and contingencies | US Dollars | | PIU Quarterly Reports | PIU | Quarterly | This indicator reflects pooled donor funding |
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | P-4 | Process | Percent disbursed of power infrastructure construction contracts | The total amount of all signed construction contracts for power infrastructure investments disbursed divided by the total current value of all signed contracts. | Percentage | | Common Payment System (CPS) Monthly Report | MCC | Quarterly | This indicator represents the percentage of MCC's financial commitment to the Mt. Coffee Hydropower Rehabilitation Activity that has already been fulfilled. |
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | P-3 | Process | Value of signed power infrastructure construction contracts | The value of all signed construction contracts for power infrastructure investments using compact funds. | US Dollars | | Liberia Compact | MCC | Quarterly | This indicator tracks MCC's contribution to the Mt. Coffee Hydropower. Rehabilitation Activity rather than the actual value of signed infrastructure contracts, which is tracked in a different indicator. These construction costs also include approximately $2 million to rehabilitate a water intake at the MCHPP site as these costs cannot be separated from the other MCHPP contract costs. |
| Rehabilitate MCHPP, Construct and rehab MCHPP transmission infrastructure | P-4.1 | Process | Value disbursed of power infrastructure construction contracts | The amount disbursed of all signed construction contracts for power infrastructure investments using compact funds. | US Dollars | | CPS Monthly Report | MCC | Quarterly | The value disbursed will be equal to the value signed. |
| | **Mt. Coffee Support Activity** | | | | | | | | | |
| | **LEC Training Center Activity** | | | | | | | | | |
| | **Energy Sector Reform Activity** | | | | | | | | | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Construct, rehabilitate, equip, staff, train, customer service centers | | Output | LEC customer service center renovated | Date LEC Waterside customer service center has been reopened for service following completion of renovation | Date | | TBD | MCA-Liberia | Once | |
| **Management Support to LEC Sub-Activity** | | | | | | | | | | |
| Improved operations of LEC | | Outcome | Aggregate technical and commercial losses | The amount of electricity generated or input to system (kWh) minus the amount in US$ for which payment is collected from customers converted to energy (kWh) divided by the amount of electricity generated or input to system (kWh) x 100 | Percentage | | LEC reports | LEC Generation, LEC Commercial and LEC Finance | Quarterly | AT&C = 1 – (revenue collected converted into MWh / total electricity supply (MWh)) x 100, where the annual value is an average of the monthly values<br><br>A re-baselining and target-setting effort is expected in connection with the MSC contract, and those values will be used to establish a baseline and targets for this indicator. |
| Improved operations of LEC | P-20 | Outcome | Commercial losses | Total distribution system losses minus distribution technical losses | Percentage | | LEC reports | LEC Generation, LEC Commercial and LEC Finance | Quarterly | $\%Com = \%Gen - \%Ttl - \% Ct = \%EAfS - \%Dtl - \%Billing$; where Energy Generated (Gen) = 100%; consumption at transmission level (Ct) = 0 (because there are currently no transmission-level customers); transmission technical loss (Ttl) is estimated at 3%; Energy Available for Sale = EAfS; Distribution Technical Losses (Dtl) are estimated at 12%; Billing = LEC Internal Consumptions + Energy billed to consumers |
| Improved operations of LEC, improved plant facilities | | Outcome | Maintenance expenditure – asset value ratio | Actual maintenance expenditures / Total value of fixed assets | Percentage | | LEC reports | LEC Finance | Annual | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Improved operations of LEC, improved plant facilities | | Outcome | Maintenance expenditures | Actual maintenance expenditures | US Dollars | | LEC reports | LEC Finance | Annual | |
| Improved operations of LEC, improved plant facilities | | Outcome | Asset value | Total value of fixed assets | US Dollars | | LEC reports | LEC Finance | Annual | |
| Increased revenue, improved financial sustainability of LEC | P-24 | Outcome | Operating cost recovery ratio | Total revenue collected / Total operating cost | Percentage | | LEC reports | LEC Finance | Annual | |
| Increased revenue, improved financial sustainability of LEC | | Outcome | Total revenue collected | Total revenue collected | US Dollars | | LEC reports | LEC Finance | Quarterly | |
| Increased revenue, improved financial sustainability of LEC | | Outcome | Collection rate | [Trailing twelve months of total value of post-paid bills collected /Total value of bills issued for same customers in trailing twelve months] x 100 | Percentage | | LEC reports | LEC Finance | Annual | |
| Improved operations of LEC | | Outcome | Operating expenses per kWh sold | The total operating expense divided by kWh sold | US Dollars | | LEC reports | LEC Finance | Annual | Total operating expense' includes: at least the fuel costs, O&M expenses, administrative expenses (salaries & benefits, outside services, insurance claims, foreign travel, vehicle expenses, LEC Board expenses, other administrative expenses etc.) and other expenses such as depreciation, interest and foreign exchange gain/loss.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of operating expense per kWh sold reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data |

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | will be reported against this indicator. |
| Improved operations of LEC | | Outcome | Operating expenses | The total operating expense in a year | US Dollars | | LEC reports | LEC Finance | Annual | Total operating expense' includes: at least the fuel costs, O&M expenses, administrative expenses (salaries & benefits, outside services, insurance claims, foreign travel, vehicle expenses, LEC Board expenses, other administrative expenses etc.) and other expenses such as depreciation, interest and foreign exchange gain/loss.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of operating expenses reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. |
| Increased consumption of electricity, increased revenue | P-23 | Outcome | Totall electricity sold (kWh) | The total kilowatt hours of electricity sales to all customer types | kWh | | LEC reports | LEC Finance | Annual | |
| Increased customer base | | Outcome | New connections added each year | Customer connections executed during the performance period that have been registered with LEC and added to the customer database | Number | LEC/donor | LEC reports | LEC Commercial | Annual | |
| **Establishment of an Independent Regulator Sub-Activity** | | | | | | | | | | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| LERC officially established | | Outcome | LERC management structure established | Date the following LERC positions have been filled: three Commissioners, Managing Director, Head: Licensing & Public Affairs, Head: Economic Regulation, Head: Technical Regulation | Date | | Quarterly update | LERC | Once | |
| LERC officially established | | Outcome | LERC officially launched | Date of public event with key sector stakeholders to announce the launch and functioning of LERC | Date | | Press release | MCA-Liberia | Once | |
| LERC officially established | | Outcome | LERC inaugural budget approved | Date LERC's inaugural budget for fiscal year 2021 (covering July 1, 2020 through June 30, 2021) has been approved by Board of Commissioners | Date | | LERC budget | LERC | Once | |
| LERC officially established | | Outcome | LERC inaugural budget passed into law | Date Board of Commissioner-approved inaugural budget has been passed into law by National Legislature | Date | | National budget that has been approved by the legislature and signed into law by the President | MCA-Liberia | Once | |
| Regulatory framework developed, adopted, implemented | | Outcome | LERC regulatory framework approved | Date that the following components of a regulatory framework have been approved by LERC: (1) licensing regulations (which will include quality of service and system planning regulations); (2) licensing manual; (3) tariff regulations; and (4) quality of supply regulations | Date | | Quarterly update | LERC | Once | |
| Regulatory framework developed, adopted, implemented | | Outcome | Dispute resolution procedures approved | Date LERC has approved procedures to address customer complaints and other related disputes | Date | | Quarterly update | LERC | Once | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Cost-reflective tariff in place | | Outcome | Interim LEC tariffs approved by LERC | Date LERC has approved interim tariffs for electricity sold by LEC | Date | | Board of Commissioner's Tariff Approval Resolution or Decision | LERC | Once | |
| Sector operators licensed and compliant | | Outcome | LEC licensed as an electricity operator | Date LERC has issued a license to LEC to operate as an electricity provider | Date | | License to operate | LERC | Once | |
| Sector operators licensed and compliant | | Outcome | Non-LEC entity licensed as an electricity operator | Date LERC has issued a license to a non-LEC entity to operate as an electricity provider | Date | | License to operate | LERC | Once | |
| | **Roads Project** | | | | | | | | | |
| Improved quality and prolonged life of road network | | Outcome | Percentage of road network in good or fair condition | The number of road segments that are found to be in "good" or "fair" condition / The total number of road segments (found to be in "good," "fair," or "poor" condition) | Percentage | | TBD Will be determined by end of 2017 and Asset Management Plan | MPW | Annual | |
| Improved quality and prolonged life of road network | | Outcome | Road segments in good or fair condition | The number of road segments that are found to be in "good" or "fair" condition | Number | Road condition | TBD Will be determined by end of 2017 | MPW | Annual | The categories for the disaggregation "Road condition" are: Good and Fair.<br><br>"Good," "Fair," and "Poor" will be defined as part of the Asset Management Plan. |
| Improved quality and prolonged life of road network | | Outcome | Road segments in Liberia's road network | The total number of road segments (found to be in "good," "fair," or "poor" condition) | Number | | Asset Management Plan | MPW | Annual | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Roads maintained according to plan | | Outcome | Percentage of roads maintained according to the annual maintenance plans developed under the Compact | Number of kilometers receiving periodic maintenance / Number of kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (regardless of available funding) | Percentage | | Contractor reports and Asset Management Plan | MPW | Quarterly | |
| Roads maintained according to plan | | Outcome | Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact | Number of kilometers of roads receiving periodic maintenance | Number | Road type | Contractor reports | MPW | Quarterly | The categories for the disaggregation “Road type” are: Primary, Secondary, and Feeder Roads. |
| Roads maintained according to plan | | Outcome | Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact | Number of kilometers that needed periodic maintenance according to the annual maintenance plans developed under the compact (regardless of available funding) | Number | Road type | Asset Management Plan | MPW | Quarterly | |
| Roads maintained according to plan | | Outcome | Expenditures on road maintenance | Actual expenditures on road maintenance by the Government | US Dollars | Type of road maintenance Road type | MPW Annual Report | MPW | Annual | The categories for the disaggregation “Type of road maintenance” are: Emergency, Routine, and Periodic. |
| Systematic and predictable asset management system implemented | | Outcome | Percentage of periodic maintenance projects completed on time | Number of periodic road works projects delivered within 30 days of the contract deadline / Number of periodic road works projects to be completed that year | Percentage | Road type | Certificates of completion and signed contracts | MPW | Annual | |
| Systematic and predictable asset management system | | Outcome | Variance of amount paid for periodic maintenance projects from original contract cost | Average variance across all contracts that conclude within a year of the following: (original contract costs for periodic maintenance projects - amount paid for periodic maintenance projects) / original contract costs for periodic maintenance projects | Ratio | Road type | TBD | MPW | Annual | Positive values indicate that, on average, payments were lower than the original contract value, while negative values indicate that, on average, payments exceeded the original contract value |
| This is not explicitly part of the program logic because MCC resources are not being used to | | Process | Road Fund operational | Date the Road Fund is operational; “operational” is defined as the date the first disbursement is made by MPW. | Date | | TBD | MPW | Once | This is a Condition Precedent. |

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| establish the road fund directly. | | | | | | | | | | |
| This is not explicitly part of the program logic because MCC resources are not being used to establish the road fund directly. | | Process | Road Fund passed and signed into law | Date the Road Fund Act is signed into law | Date | | Law | MPW | Once | |
| This is not explicitly part of the program logic, but is necessary for project implementation. | | Process | Agreement with Volpe for implementation signed | Date the agreement between Volpe and MCC is signed | Date | | Contract | MCC | Once | |
| | **National Road Maintenance Activity** | | | | | | | | | |
| Road maintenance funded | | Outcome | Funds provided to the Road Fund | Actual amount deposited in the Road Fund account | US Dollars | Liberia Road Fund source | TBD | TBD | Quarterly | The categories for the disaggregation "Liberia Road Fund source" are: Government appropriations, Grants and loans, and Road user charges. |
| Public sector trained to carry out road works | | Output | Percentage of relevant positions that are occupied by a trained staff member | Number of relevant positions that are occupied by a trained staff member / Number of relevant positions | Percentage | | TBD | Volpe, MPW | Annual | |
| Matching funds for maintenance provided | | Output | Matching funds for road maintenance provided by MCC | Matching funds provided to the Government by MCC for road maintenance | US Dollars | | CPS Monthly Report | MCA-L | Quarterly | |
| Pilot road maintenance centers constructed | | Output | Pilot road maintenance centers operational | Pilot road maintenance centers built or rehabilitated, equipped, and staffed | Number | | Taking over certificate for building, Contractor report for equipment, Proof key staff positions have been filled | MCA-L | Quarterly | |
| | **Road Sector Reform Activity** | | | | | | | | | |

**Liberia**
**Annex I: Indicator Documentation Table**

| Program Logic Result | CI Code | Indicator Level | Indicator Name | Definition | Unit of Measure | Disaggregation | Primary Data Source | Responsible Party | Frequency of Reporting | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|
| Road maintenance management systems created with assets inventoried | | Output | Road Maintenance Management System accepted | Either improved Road Maintenance Management System (RMMS) or new RMMS accepted by MPW | Date | | Documentation of acceptance of RMMS | MPW | Once | The RMMS is the decision-support model used to prioritize road maintenance works. |
| Public sector trained to carry out road works | | Output | Percentage of relevant positions that are occupied by a trained staff member | Number of relevant positions that are occupied by a trained staff member / Number of relevant positions | Percentage | | TBD | Volpe, MPW | Annual | |
| This is not explicitly part of the program logic because MCC resources are not being used to develop or pass the law. | | Process | Axle Load Control Law passed and signed into law | Date the Axle Load Control Law is signed into law | Date | | Law | MoT | Once | This is a Condition Precedent. |
| Collection of road data | | Process | Roadway inventory developed | Database of roadway condition data and other data related to structures on the road network accepted by MPW | Date | | Documentation of acceptance of database and data dictionary | MPW | Once | The exact types of data will be determined in consultation with GoL/GIZ who are involved in roadway inventory work currently. |
| Collection of road data | | Process | Traffic counts conducted | Database of traffic volume data by vehicle type for dry and wet seasons on the primary and secondary road network using the count locations from the Transport Master Plan completed | Date | | Documentation of acceptance of database and data dictionary | MPW | Once | |
| Asset Management Plan development | | Process | Asset Management Plan developed | Date upon which an Asset Management Plan for prioritizing and allocating road maintenance resources has been accepted by MPW | Date | | Documentation of acceptance of Asset Management Plan | MPW | Once | |

# ANNEX II: TABLE OF INDICATOR BASELINES AND TARGETS

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| **Energy Project** | | | | | | | | | | | |
| Outcome | Total electricity supply | Megawatt hours | Level (Cumulative) | 62,039 (2015) | 206,550 | 319,070 | 319,070 | 319,070 | 319,070 | 319,070 | . |
| *Outcome* | *Total electricity supply (Domestic)* | *Megawatt hours* | *Level (Cumulative)* | *48,975 (2015)* | | | | | | | |
| *Outcome* | *Total electricity supply (Imports)* | *Megawatt hours* | *Level (Cumulative)* | *0 (2015)* | | | | | | | |
| *Outcome* | *Total electricity supply (Unspecified)* | *Megawatt hours* | *Level (Cumulative)* | | | | | | | | |
| Outcome | Total electricity supply – revised CBA | Megawatt hours | Level (Cumulative) | 62,039 (2015) | 98,766 | 146,498 | 203,062 | 231,737 | 254,180 | 254,180 | |
| *Outcome* | *Total electricity supply – revised CBA (Domestic)* | *Megawatt hours* | *Level (Cumulative)* | *48,975 (2015)* | | | | | | | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Total electricity supply – revised CBA (Imports)* | *Megawatt hours* | *Level (Cumulative)* | *0 (2015)* | | | | | | | |
| *Outcome* | *Total electricity supply – revised CBA (Unspecified)* | *Megawatt hours* | *Level (Cumulative)* | | | | | | | | |
| Outcome | Total electricity sold | Megawatt hours | Level (Cumulative) | 37,464 (2015) | 128,480 | 198,460 | 198,460 | 198,460 | 198,460 | 198,460 | |
| *Outcome* | *Total electricity sold (Residential)* | *Megawatt hours* | *Level (Cumulative)* | 19,237 *(2015)* | | | | | | | |
| *Outcome* | *Total electricity sold (Commercial)* | *Megawatt hours* | *Level (Cumulative)* | 9,065 *(2015)* | | | | | | | |
| *Outcome* | *Total electricity sold (Industrial)* | *Megawatt hours* | *Level (Cumulative)* | *0 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold (Government)* | *Megawatt hours* | *Level (Cumulative)* | *7,806 (2015)* | | | | | | | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Total electricity sold (Other)* | *Megawatt hours* | *Level (Cumulative)* | *1,294 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold (Unspecified)* | *Megawatt hours* | *Level (Cumulative)* | *62 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold (Single-phase)* | *Megawatt hours* | *Level (Cumulative)* | *18,822 (2015)* | *50,610* | *92,740* | *92,740* | *92,740* | *92,740* | *92,740* | |
| *Outcome* | *Total electricity sold (Three-phase)* | *Megawatt hours* | *Level (Cumulative)* | *7,124 (2015)* | *20,710* | *34,540* | *34,540* | *34,540* | *34,540* | *34,540* | |
| *Outcome* | *Total electricity sold (CT)* | *Megawatt hours* | *Level (Cumulative)* | *11,518 (2015)* | *57,160* | *71,180* | *71,180* | *71,180* | *71,180* | *71,180* | |
| Outcome | Total electricity sold – revised CBA | Megawatt hours | Level (Cumulative) | 37,464 (2015) | 54,420 | 80,720 | 111,887 | 127,687 | 140,053 | 140,053 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Total electricity sold – revised CBA (Residential)* | *Megawatt hours* | *Level (Cumulative)* | 19,237 *(2015)* | | | | | | | |
| *Outcome* | *Total electricity sold – revised CBA (Commercial)* | *Megawatt hours* | *Level (Cumulative)* | 9,065 *(2015)* | | | | | | | |
| *Outcome* | *Total electricity sold – revised CBA (Industrial)* | *Megawatt hours* | *Level (Cumulative)* | *0 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold – revised CBA (Government)* | *Megawatt hours* | *Level (Cumulative)* | *7,806 (2015)* | | | | | | | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Total electricity sold – revised CBA (Other)* | *Megawatt hours* | *Level (Cumulative)* | *1,294 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold – revised CBA (Unspecified)* | *Megawatt hours* | *Level (Cumulative)* | *62 (2015)* | | | | | | | |
| *Outcome* | *Total electricity sold – revised CBA (Single-phase)* | *Megawatt hours* | *Level (Cumulative)* | *18,822 (2015)* | *32,848* | *46,072* | *62,375* | *74,823* | *87,310* | *87,310* | |
| *Outcome* | *Total electricity sold – revised CBA (Three-phase)* | *Megawatt hours* | *Level (Cumulative)* | *7,124 (2015)* | *4,832* | *7,519* | *10,766* | *12,896* | *12,869* | *12,869* | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Total electricity sold – revised CBA (CT)* | *Megawatt hours* | *Level (Cumulative)* | *11,518 (2015)* | *16,740* | *27,130* | *38,746* | *39,968* | *39,874* | *39,874* | |
| Outcome | Percentage of households connected to the national grid | Percentage | Level | 3.9 (2015) | TBD | TBD | TBD | TBD | TBD | TBD | |
| Outcome | Households that have access to a legal connection to electricity service from an electrical utility or service provider | Number | Level | 30,475 (2015) | TBD | TBD | TBD | TBD | TBD | TBD | |
| Outcome | Total number of households in the country | Number | Level | 789,245 (2015) | 808,465 | 827,685 | 846,904 | 866,124 | 885,344 | 885,344 | |
| Outcome | Customers connected to the grid | Number | Level | 36,964 (2015) | 59,350 | 105,101 | 105,101 | 105,101 | 105,101 | 105,101 | |
| *Outcome* | *Customers connected to* | *Number* | *Level* | *33,296 (2015)* | | | | | | | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| | *the grid (Residential)* | | | | | | | | | | |
| *Outcome* | *Customers connected to the grid (Commercial)* | *Number* | *Level* | *3,441 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid (Industrial)* | *Number* | *Level* | *0 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid (Government)* | *Number* | *Level* | *159 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid (Other)* | *Number* | *Level* | *65 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid (Unspecified)* | *Number* | *Level* | 3 (2015) | | | | | | | |
| *Outcome* | *Customers connected to the grid (Single-phase)* | *Number* | *Level* | 35,531 (2015) | 58,000 | 103,000 | 103,000 | 103,000 | 103,000 | 103,000 | |
| *Outcome* | *Customers connected to the grid* | *Number* | *Level* | 1,236 (2015) | 1,215 | 1,940 | 1,940 | 1,940 | 1,940 | 1,940 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| | *(Three-phase)* | | | | | | | | | | |
| *Outcome* | *Customers connected to the grid (CT)* | *Number* | *Level* | 197 (2015) | 135 | 161 | 161 | 161 | 161 | 161 | |
| Outcome | Customers connected to the grid – revised CBA | Number | Level | 36,964 (2015) | 38,879 | 52,792 | 66,705 | 80,552 | 94,153 | 94,153 | |
| *Outcome* | *Customers connected to the grid – revised CBA (Residential)* | *Number* | *Level* | *33,296 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid – revised CBA (Commercial)* | *Number* | *Level* | *3,441 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid – revised CBA (Industrial)* | *Number* | *Level* | *0 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid –* | *Number* | *Level* | *159 (2015)* | | | | | | | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| | *revised CBA (Government)* | | | | | | | | | | |
| *Outcome* | *Customers connected to the grid – revised CBA (Other)* | *Number* | *Level* | *65 (2015)* | | | | | | | |
| *Outcome* | *Customers connected to the grid – revised CBA (Unspecified)* | *Number* | *Level* | 3 (2015) | | | | | | | |
| *Outcome* | *Customers connected to the grid – revised CBA (Single-phase)* | *Number* | *Level* | 35,531 (2015) | 38,149 | 51,746 | 65,343 | 78,940 | 92,537 | 92,537 | |
| *Outcome* | *Customers connected to the grid – revised CBA (Three-phase)* | *Number* | *Level* | 1,236 (2015) | 598 | 900 | 1,202 | 1,450 | 1,454 | 1,454 | |
| *Outcome* | *Customers connected to the grid – revised CBA (CT)* | *Number* | *Level* | 197 (2015) | 132 | 146 | 160 | 162 | 162 | 162 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Outcome | System Average Interruption Frequency Index (SAIFI) | Rate | Level | TBD | | | | TBD | TBD | TBD | |
| Outcome | System Average Interruption Duration Index (SAIDI) | Hours | Level | TBD | | | | TBD | TBD | TBD | |
| Outcome | Adequacy of supply | Rate | Level (Average) | 0.95 (2015) | | | 1.2 | 1.2 | 1.2 | 1.2 | |
| Outcome | Available power plant generation capacity | Megawatts | Level (Average) | 11.94 (2015) | | | | | | | |
| Outcome | Peak demand | Megawatts | Level (Average) | 12.6 (2015) | | | | | | | |
| Outcome | Power plant availability | Percentage | Level | 63 (2015) | | | | | | | Targets will not be established per Additional Information in Annex I. |
| *Outcome* | *Power plant availability (Mt. Coffee)* | *Percentage* | *Level* | *0 (2015)* | | | 97 | 97 | 97 | 97 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Power plant availability (HFO)* | *Percentage* | *Level* | *0 (2015)* | | | | | | | |
| *Outcome* | *Power plant availability (Diesel generators)* | *Percentage* | *Level* | *63 (2015)* | | | | | | | |
| *Outcome* | *Power plant availability (Unspecified)* | *Percentage* | *Level* | | | | | | | | |
| Outcome | Electricity tariff | US Dollars | Level | 0.52 (2016) | TBD | TBD | TBD | TBD | TBD | TBD | Targets are TBD pending a Cost of Service study to occur in Y2 and a determination of whether to establish a target or consider as "N/A" since it is unclear that a single tariff will be "correct" though it might be possible to identify a single point if a suitable range is narrow enough. Determination expected in Y2 or Y3. |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Electricity tariff (Residential)* | *US Dollars* | *Level* | *0.52 (2016)* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | |
| *Outcome* | *Electricity tariff (Commercial)* | *US Dollars* | *Level* | *0.52 (2016)* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | |
| *Outcome* | *Electricity tariff (Industrial)* | *US Dollars* | *Level* | | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | |
| *Outcome* | *Electricity tariff (Government)* | *US Dollars* | *Level* | *0.52 (2016)* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | |
| *Outcome* | *Electricity tariff (Other)* | *US Dollars* | *Level* | *0.52 (2016)* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | *TBD* | |
| *Outcome* | *Electricity tariff (Unspecified)* | *US Dollars* | *Level* | | | | | | | | |
| **Mt. Coffee Rehabilitation Activity** | | | | | | | | | | | |
| Outcome | Share of renewable energy in the country | Percentage | Level | 0 (2015) | 28 | 61 | 57 | 57 | 57 | 57 | |
| Outcome | Installed generation capacity | Megawatts | Level | 22 (2015) | 79 | 145 | 155 | 155 | 155 | 155 | |
| *Outcome* | *Installed generation capacity (On-grid)* | *Megawatts* | *Level* | *22 (2015)* | *79* | *145* | *155* | *155* | *155* | *155* | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Installed generation capacity (Unspecified)* | *Megawatts* | *Level* | | | | | | | | |
| Outcome | Mt. Coffee Hydropower Plant Capacity Factor | Percentage | Level | 0 (2015) | | 55.6 | 55.6 | 55.6 | 55.6 | 55.6 | |
| Outcome | Percentage of electricity supplied by Mt. Coffee Hydropower Plant | Percentage | Level | 0 (2015) | 18 | 57 | 57 | 57 | 57 | 57 | |
| Outcome | Percentage of electricity supplied by Mt. Coffee Hydropower Plant – revised CBA | Percentage | Level | 0 (2015) | 4 | 69 | 70 | 68 | 66 | 66 | |
| Output | Generation capacity added | Megawatts | Cumulative | 0 (2016) | 22 | 88 | 88 | 88 | 88 | 88 | |
| *Output* | *Generation capacity added (On-grid)* | *Megawatts* | *Cumulative* | *0 (2016)* | *22* | *88* | *88* | *88* | *88* | *88* | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Output | Transmission substation capacity added | Megavolt Ampere | Cumulative | 0 (2016) | 122 | 122 | 122 | 122 | 122 | 122 | |
| Output | Kilometers of transmission lines upgraded or built | Kilometers | Cumulative | 0 (2016) | 24 | 51 | 51 | 51 | 51 | 51 | |
| Process | Percent disbursed for Mt. Coffee Hydropower Plant rehabilitation | Percentage | Level | 39 (2016) | 86 | 100 | 100 | 100 | 100 | 100 | |
| Process | Total amount allocated for Mt. Coffee Hydropower Plant rehabilitation | US Dollars | Cumulative | 356,762,257 (2016) | 356,762,257 | 356,762,257 | 356,762,257 | 356,762,257 | 356,762,257 | 356,762,257 | |
| Process | Value disbursed for Mt. Coffee Hydropower Plant rehabilitation | US Dollars | Cumulative | 137,924,885 (2016) | 308,371,500 | 356,762,257 | 356,762,257 | 356,762,257 | 356,762,257 | 356,762,257 | |
| Process | Percent disbursed of power infrastructure | Percentage | Level | 0 (2016) | 54 | 100 | 100 | 100 | 100 | 100 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| | construction contracts | | | | | | | | | | |
| Process | Value of signed power infrastructure construction contracts | US Dollars | Cumulative | 0 (2016) | 146,800,000 | 146,800,000 | 146,800,000 | 146,800,000 | 146,800,000 | 146,800,000 | |
| Process | Value disbursed of power infrastructure construction contracts | US Dollars | Cumulative | 0 (2016) | 80,000,000 | 146,800,000 | 146,800,000 | 146,800,000 | 146,800,000 | 146,800,000 | |
| **Mt. Coffee Support Activity** | | | | | | | | | | | |
| **LEC Training Center Activity** | | | | | | | | | | | |
| **Energy Sector Reform Activity** | | | | | | | | | | | |
| Output | LEC customer service center renovated | Date | Date | | | | | | 31-Oct-20 | 31-Oct-20 | |
| **Management Support to LEC Sub-Activity** | | | | | | | | | | | |
| Outcome | Aggregate Technical and Commercial Losses | Percentage | Level (Average) | TBD | | | | TBD | TBD | TBD | |
| Outcome | Commercial Losses | Percentage | Level (Average) | TBD | | | | TBD | TBD | TBD | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Outcome | Maintenance expenditure – asset value ratio | Percentage | Level | 0.4 (2015) | | | | 2 | 2 | 2 | |
| Outcome | Maintenance expenditures | US Dollars | Level | 790,000 (2015) | | | | 10,275,000 | 11,491,000 | 11,491,000 | |
| Outcome | Asset value | US Dollars | Level | 202,162,000 (2015) | | | | 503,783,000 | 497,381,000 | 497,381,000 | |
| Outcome | Operating cost recovery ratio | Percentage | Level (Cumulative) | 88 (2015) | | | | 64 | 115 | 115 | |
| Outcome | Total revenue collected | US Dollars | Level (Cumulative) | 18,395,000 (2015) | | | | 29,093,000 | 76,342,000 | 76,342,000 | |
| Outcome | Collection rate | Percentage | Level | 77.4 (2015) | | | | 91 | 98 | 98 | |
| Outcome | Operating expenses per kWh sold | US Dollars | Level (Average) | 0.58 (2015) | | | | 0.52 | 0.29 | 0.29 | |
| Outcome | Operating expenses | US Dollars | Level (Average) | 20,909,000 (2015) | | | | 45,503,000 | 66,099,000 | 66,099,000 | |
| Outcome | Total electricity sold | kWh | Level (Average) | 36,278,566 (2015) | | | | 127,687,000 | 140,053,000 | 140,053,000 | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Outcome | New connections added each year | Number | Level (Cumulative) | | | | | TBD | TBD | TBD | |
| Outcome | *New connections added each year (LEC)* | Number | Level (Cumulative) | | | | | TBD | TBD | TBD | |
| Outcome | *New connections added each year (Donor)* | Number | Level (Cumulative) | | | | | TBD | TBD | TBD | |
| **Establishment of an Independent Regulator Sub-Activity** | | | | | | | | | | | |
| Outcome | LERC management structure established | Date | Date | | | | | 31-Dec-19 | | 31-Dec-19 | |
| Outcome | LERC officially launched | Date | Date | | | | | | 31-Mar-20 | 31-Mar-20 | |
| Outcome | LERC inaugural budget approved | Date | Date | | | | | | 30-Mar-20 | 30-Mar-20 | |
| Outcome | LERC inaugural budget passed into law | Date | Date | | | | | | 30-Sept-20 | 30-Sept-20 | |
| Outcome | LERC regulatory framework approved | Date | Date | | | | | | 31-Dec-20 | 31-Dec-20 | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| Outcome | Dispute resolution procedures approved | Date | Date | | | | | | 31-Dec-20 | 31-Dec-20 | |
| Outcome | Interim LEC tariffs approved by LERC | Date | Date | | | | | 30-Nov-19 | | 30-Nov-19 | |
| Outcome | LEC licensed as an electricity operator | Date | Date | | | | | 31-Dec-19 | | 31-Dec-19 | |
| Outcome | Non-LEC entity licensed as an electricity operator | Date | Date | | | | | | 29-Feb-20 | 29-Feb-20 | |
| **Roads Project** | | | | | | | | | | | |
| Outcome | Percentage of road network in good or fair condition | Percentage | Level | TBD (2017) | | | TBD | TBD | TBD | TBD | Baseline is pending Volpe's analysis of road network.<br><br>Targets will be established after approval of the Asset Management Plan and will also take into account the available budget. |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| Outcome | Road segments in good or fair condition | Number | Level | TBD (2017) | | | TBD | TBD | TBD | TBD | Baseline is pending Volpe's analysis of road network.<br><br>Targets will be established after approval of the Asset Management Plan and will also take into account the available budget. |
| *Outcome* | *Road segments in good or fair condition (Good)* | *Number* | *Level* | *TBD (2017)* | | | *TBD* | *TBD* | *TBD* | *TBD* | *Baseline is pending Volpe's analysis of road network.*<br><br>*Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.* |
| *Outcome* | *Road segments in good or fair condition (Fair)* | *Number* | *Level* | *TBD (2017)* | | | *TBD* | *TBD* | *TBD* | *TBD* | *Baseline is pending Volpe's analysis of road network.*<br><br>*Targets will be established after* |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | | | | | | | *approval of the Asset Management Plan and will also take into account the available budget.* |
| *Outcome* | *Road segments in good or fair condition (Unspecified)* | *Number* | *Level* | *TBD (2017)* | | | *TBD* | *TBD* | *TBD* | *TBD* | *Baseline is pending Volpe's analysis of road network.*<br><br>*Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.* |
| Outcome | Road segments in Liberia's road network | Number | Level | TBD (2017) | | | TBD | TBD | TBD | TBD | Baseline is pending Volpe's analysis of road network.<br><br>Targets will be established after approval of the Asset Management Plan and will also take into account the available budget. |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Outcome | Percentage of roads maintained according to the annual maintenance plan developed under the Compact | Percentage | Level | | | | TBD | TBD | TBD | TBD | Targets to be established after the asset management plan is developed; expected in Y3. |
| Outcome | Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact | Number | Level | | | | TBD | TBD | TBD | TBD | Targets to be established after the asset management plan is developed; expected in Y3. |
| *Outcome* | *Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| | *Compact (Primary)* | | | | | | | | | | |
| *Outcome* | *Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Secondary)* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |
| *Outcome* | *Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| | *Compact (Feeder roads)* | | | | | | | | | | |
| *Outcome* | *Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Unspecified)* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |
| Outcome | Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact | Number | Level | | | | TBD | TBD | TBD | TBD | Targets to be established after the asset management plan is developed; expected in Y3. |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Primary)* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |
| *Outcome* | *Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Secondary)* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |
| *Outcome* | *Kilometers that need periodic maintenance according to the annual maintenance plans developed under the* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| | *Compact (Feeder roads)* | | | | | | | | | | |
| *Outcome* | *Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Unspecified)* | *Number* | *Level* | | | | *TBD* | *TBD* | *TBD* | *TBD* | *Targets to be established after the asset management plan is developed; expected in Y3.* |
| Outcome | Expenditures on road maintenance | US Dollars | Level | TBD (2015) | | | TBD | TBD | TBD | TBD | Targets will be set after the Road Fund is in place and projections are made based on expected revenue for the Road Fund. Funds will begin to be collected in Y3. |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Expenditures on road maintenance (Primary)* | *US Dollars* | *Level* | | | | | | | | |
| *Outcome* | *Expenditures on road maintenance (Secondary)* | *US Dollars* | *Level* | | | | | | | | |
| *Outcome* | *Expenditures on road maintenance (Feeder roads)* | *US Dollars* | *Level* | | | | | | | | |
| *Outcome* | *Expenditures on road maintenance (Unspecified)* | *US Dollars* | *Level* | | | | | | | | |
| *Outcome* | *Expenditures on road maintenance (Emergency)* | *US Dollars* | *Level* | | | | | | | | |
| *Outcome* | *Expenditures on road maintenance (Routine)* | *US Dollars* | *Level* | | | | | | | | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Expenditures on road maintenance (Periodic)* | *US Dollars* | *Level* | | | | | | | | |
| Outcome | Percentage of periodic maintenance projects completed on time | Percentage | Level | 0 (2015) | | | 60 | 80 | 100 | 100 | |
| *Outcome* | *Percentage of periodic maintenance projects completed on time (Primary)* | *Percentage* | *Level* | | | | | | | | |
| *Outcome* | *Percentage of periodic maintenance projects completed on time (Secondary)* | *Percentage* | *Level* | | | | | | | | |
| *Outcome* | *Percentage of periodic maintenance projects completed on* | *Percentage* | *Level* | | | | | | | | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1<br>Jan-16 to Dec-16 | Year 2<br>Jan-17 to Dec-17 | Year 3<br>Jan-18 to Dec-18 | Year 4<br>Jan-19 to Dec-19 | Year 5<br>Jan-20 to Jan-21 | End of Compact Target | Timeline for resolving TBDs |
| | *time (Feeder roads)* | | | | | | | | | | |
| *Outcome* | *Percentage of periodic maintenance projects completed on time (Unspecified)* | *Percentage* | *Level* | | | | | | | | |
| Outcome | Variance of amount paid for periodic maintenance projects from original contract cost | Ratio | Level | TBD (2015) | TBD | TBD | TBD | TBD | 0 | 0 | Baselines and targets expected in Y2. Volpe will develop baseline of existing conditions during implementation; this information is needed before targets can be established. |
| *Outcome* | *Variance of amount paid for periodic maintenance projects from original contract cost (Primary)* | *Ratio* | *Level* | | | | | | | | |

| Liberia<br>Annex II: Table of Indicator Baselines and Targets | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Variance of amount paid for periodic maintenance projects from original contract cost (Secondary)* | *Ratio* | *Level* | | | | | | | | |
| *Outcome* | *Variance of amount paid for periodic maintenance projects from original contract cost (Feeder roads)* | *Ratio* | *Level* | | | | | | | | |
| *Outcome* | *Variance of amount paid for periodic maintenance projects from original contract cost (Unspecified)* | *Ratio* | *Level* | | | | | | | | |
| Process | Road Fund operational | Date | Date | | | 01-Apr-17 | | | | 01-Apr-17 | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Process | Road Fund passed and signed into law | Date | Date | | 01-Oct-16 | | | | | 01-Oct-16 | |
| Process | Agreement with Volpe for implementation signed | Date | Date | N/A | 15-Jul-16 | | | | | 15-Jul-16 | |
| **National Road Maintenance Activity** | | | | | | | | | | | |
| Outcome | Funds provided to the Road Fund | US Dollars | Cumulative | 0 (2016) | | | TBD | TBD | TBD | TBD | Targets to be established after the road fund legislation has been passed. Funds will begin to be collected in Y3. |
| *Outcome* | *Funds provided to the Road Fund (Government appropriations)* | *US Dollars* | *Cumulative* | 0 (2016) | | | | | | | |
| *Outcome* | *Funds provided to the Road Fund (Grants and loans)* | *US Dollars* | *Cumulative* | 0 (2016) | | | | | | | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| *Outcome* | *Funds provided to the Road Fund (Road user charges)* | *US Dollars* | *Cumulative* | 0 (2016) | | | | | | | |
| *Outcome* | *Funds provided to the Road Fund (Unspecified)* | *US Dollars* | *Cumulative* | | | | | | | | |
| Output | Percentage of relevant positions that are occupied by a trained staff member | Percentage | Level | 0 (2016) | | | 100 | 100 | 100 | 100 | |
| Output | Matching funds for road maintenance provided by MCC | US Dollars | Cumulative | 0 (2016) | | | TBD | TBD | 8,000,000 | 8,000,000 | Interim targets are pending further information about the Activity. Funds will begin to be collected in Y3. |
| Output | Pilot road maintenance centers operational | Number | Cumulative | 0 (2016) | 0 | | | 2 | 2 | 2 | |
| **Road Sector Reform Activity** | | | | | | | | | | | |

**Liberia**
**Annex II: Table of Indicator Baselines and Targets**

| Indicator Level | Indicator Name | Unit of Measure | Indicator Classification | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact Target | Timeline for resolving TBDs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Jan-16 to Dec-16 | Jan-17 to Dec-17 | Jan-18 to Dec-18 | Jan-19 to Dec-19 | Jan-20 to Jan-21 | | |
| Output | Road Maintenance Management System accepted | Date | Date | | | | 31-Mar-18 | | | 31-Mar-18 | |
| Output | Percentage of relevant positions that are occupied by a trained staff member | Percentage | Level | | | | 100 | 100 | 100 | 100 | |
| Process | Axle Load Control Law passed and signed into law | Date | Date | | 01-Oct-16 | | | | | 01-Oct-16 | |
| Process | Roadway inventory developed | Date | Date | | | | 31-Dec-17 | | | 31-Dec-17 | |
| Process | Traffic counts conducted | Date | Date | | | | 30-Jun-18 | | | 30-Jun-18 | |
| Process | Asset Management Plan developed | Date | Date | | | | 30-Jun-18 | | | 30-Jun-18 | |

# ANNEX III: M&E PLAN MODIFICATIONS

**Indicator Changes:**

| *Customers added* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Mt. Coffee Rehabilitation Activity | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator removed |
| | **Justification:** | Indicator was redundant |
| | **Justification Description:** | This indicator intended to track the number of new customers added to the electricity grid during the Compact. However, another indicator (*Customers connected to the grid*) tracks the total number of customers connected to the electricity grid before, during, and after the Compact making the removed indicator redundant. |

| *Roughness* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | N/A | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator removed |
| | **Justification:** | Not a monitoring indicator |
| | **Justification Description:** | This indicator is still expected to be key in assessing the result of "Improved quality and prolonged life of road network." However, it will be measured through an independent evaluation, rather than through routine monitoring. |

| *Percentage of roads maintained according to the maintenance plan* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | N/A | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | 1. Indicator name changed<br>2. Indicator definition changed |
| | **Justification:** | 1. To add clarity<br>2. To add clarity |
| | **Justification Description:** | 1. Indicator name changed to "*Percentage of roads maintained according to the annual maintenance plans developed under the Compact*" to clarify annual nature of plans<br>2. Indicator definition changed to "Number of kilometers receiving periodic maintenance / Number of kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (regardless of available funding)" to clarify that only periodic maintenance will be tracked |

| *Expenditures on road maintenance* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | N/A | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator definition changed |
| | **Justification:** | To add clarity |
| | **Justification Description:** | The indicator definition now specifies that expenditures will be made "by the Government." |

| *Road fund established* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | N/A | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | 1. Indicator name changed<br>2. Indicator definition changed |
| | **Justification:** | 1. To add clarity<br>2. To add clarity |
| | **Justification Description:** | 1. Indicator name changed to "*Road Fund passed and signed into law*" to clarify what is being tracked<br>2. Indicator definition changed to "Date the Road Fund Act is signed into law" to clarify when the indicator will be tracked |

| *Fuel levy collected and provided to the Road Fund* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | National Road Maintenance Activity | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator replaced |
| | **Justification:** | To add clarity and provide more useful information |
| | **Justification Description:** | The new indicator (*Funds provided to the Road Fund,* defined as "Actual amount deposited in the Road Fund account") will report on all funds added to the Road Fund rather than just those coming from a fuel levy. It will also be reported in US Dollars rather than as a percentage of the amount targeted for collection; this can then be compared to the indicator *Matching funds for road maintenance provided by MCC*. |

| *Staff trained* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | National Road Maintenance Activity, Road Sector Reform Activity | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator replaced |
| | **Justification:** | To add clarity and provide more useful information |
| | **Justification Description:** | The new indicator (*Percentage of relevant positions that are occupied by a trained staff member,* defined as "Number of relevant positions that are occupied by a trained staff member / Number of relevant positions") will provide critical information about whether the people trained under the Compact are (and continue to be) in the positions where key skills are needed. |

| *Pilot road maintenance centers developed* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | National Road Maintenance Activity | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | Indicator name changed |
| | **Justification:** | To add clarity |
| | **Justification Description:** | Indicator name changed to "*Pilot road maintenance centers operational*" to be clearer about what the indicator intends to measure. |

| *Axle control law passed* | | |
|---|---|---|
| Project: | Roads Project | |
| Activity: | Road Sector Reform Activity | |
| Sub-Activity: | N/A | |
| | | |
| July 2016 | **Change Description:** | 3. Indicator name changed<br>4. Indicator definition changed |
| | **Justification:** | 3. To add clarity<br>4. To add clarity |
| | **Justification Description:** | 1. Indicator name changed to "*Axle Load Control Law passed and signed into law*" to clarify what is being tracked<br>2. Indicator definition changed to "Date the Axle Load Control Law is signed into law" to clarify when the indicator will be tracked |

| *Total Electricity Supply* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | Baseline Modification | | | | | |
| | **Change:** | Previous | | | | Revised | |
| | | 48,975 | | | | 62,029 | |
| | **Justification:** | Corrections to erroneous data | | | | | |
| | **Justification Description:** | Baseline value was updated to reflect the total electricity supplied for calendar year 2015. These data became available after a validation exercise was completed by Tetra Tech in 2018 and are more accurate than the previous baseline value, which aggregated supply between July 2014 and June 2015. | | | | | |
| | | | | | | | |
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | 206,550 | 319,070 | 319,070 | 319,070 | 319,070 | 319,070 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Previous Targets | TBD | TBD | TBD | TBD | TBD | TBD |
| | **Justification:** | TBD replaced with target | | | | | |
| | **Justification Description:** | Targets established based on the Energy Project's original CBA in order to track progress. | | | | | |
| | | | | | | | |
| | **Change Description:** | Add the following note to the "Additional Information" column in Annex I: "Liberia currently imports a small amount of energy from Cote d'Ivoire to serve communities in three border counties. Unfortunately, this energy is not well documented by LEC. Once that information is more readily available, and once energy is being imported from CLSG, we will determine a way to incorporate that reporting.<br><br>The baseline value differs from those used in the original and revised CBA models (i.e., original model: 54,860; revised model: 71,574). The baseline value used in the M&E Plan is based on LEC data as of December 2015, while the baseline value used in the original CBA is based on the 2014 Least Cost Power Development Plan.<br><br>Update the Responsible Party to: LEC Generation. | | | | | |
| | **Justification:** | Additional Information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Total Electricity Supply – revised CBA* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | New indicator | | | | | |
| | **Justification:** | Relevant due to ERR recalculation | | | | | |
| | **Justification Description:** | This indicator will track progress against revised CBA projections that reflect delays in making LEC connections. | | | | | |
| | | | | | | | |
| | **Change Description:** | This indicator will have the following targets and all other indicator documentation (including baseline values) will mirror the *Total Electricity Supply* indicator. | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Targets | 98,766 | 146,498 | 203,062 | 231,737 | 254,180 | 254,180 |

| *Total Electricity Sold* | | | |
|---|---|---|---|
| Project: | Energy Project | | |
| Activity: | N/A | | |
| | | | |
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | Total | 36,956 | 37,464 |
| | Residential | 17,430 | 19,237 |
| | Commercial | 8,656 | 9,065 |
| | Industrial | 0 | 0 |
| | Government | 8,592 | 7,806 |
| | Other | 2,255 | 1,294 |
| | Unspecified | N/A | 62 |
| | Single-phase | N/A | 18,822 |
| | Three-phase | N/A | 7,124 |
| | CT | N/A | 11,518 |
| | **Justification:** | Corrections to erroneous data, baselines added | |
| | **Justification Description:** | Revised baseline values are considered more accurate because they are based on a data validation exercise completed by Tetra Tech in 2018. Additional baselines recorded for the newly-added disaggregations. | |
| | | | |
| | **Change Description:** | Target Modification | |

| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Previous Targets (Total) | TBD | TBD | TBD | TBD | 289,396 | 289,396 |
| | Revised Targets (Total) | 128,480 | 198,460 | 198,460 | 198,460 | 198,460 | 198,460 |
| | New Targets (Single-phase) | 50,610 | 92,740 | 92,740 | 92,740 | 92,740 | 92,740 |
| | New Targets (Three-phase) | 20,710 | 34,540 | 34,540 | 34,540 | 34,540 | 34,540 |
| | New Targets (CT) | 57,160 | 71,180 | 71,180 | 71,180 | 71,180 | 71,180 |
| | **Justification:** | TBD replaced with Target | | | | | |
| | **Justification Description:** | Targets and disaggregations established and/or revised based on the Project's cost-benefit analysis (CBA) model.<br><br>The original Y5 target was calculated by multiplying the amount of electricity supplied, as forecast in the CBA, by the tariff rate. However, this was incorrect because it did not first account for commercial losses, which are technically not "sold," though they are consumed. The revised target accounts for commercial losses.<br><br>New disaggregations have been added for single-phase, three-phase, and CT customers to align with the customer categories tracked in the CBA. These disaggregations sum to the total but do not map neatly to the residential, commercial, industrial, government, and other customer categories as tracked by LEC. | | | | | |

| *Total Electricity Sold – revised CBA* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | N/A | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Relevant due to ERR recalculation |

| | | |
|---|---|---|
| | **Justification Description:** | This indicator will track progress against revised CBA projections that reflect delays in connecting LEC customers. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change Description:** | This indicator will have the following targets and all other indicator documentation (including baseline values for relevant disaggregations) will mirror the *Total Electricity Sold* indicator. | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | New Targets (Total) | 54,420 | 80,720 | 111,887 | 127,687 | 140,053 | 140,053 |
| | New Targets (Single-phase) | 32,848 | 46,072 | 62,375 | 74,823 | 87,310 | 87,310 |
| | New Targets (Three-Phase) | 4,832 | 7,519 | 10,766 | 12,896 | 12,869 | 12,869 |
| | New Targets (CT) | 16,740 | 27,130 | 38,746 | 39,968 | 39,874 | 39,874 |

| *Percentage of households in LEC service area connected to the national grid* | |
|---|---|
| Project: | Energy Project |
| Activity: | N/A |

| | | |
|---|---|---|
| | **Change Description:** | Retire Indicator |
| | **Justification:** | Indicator quality is determined poorer than initially thought when included in plan |
| | **Justification Description:** | Because LEC has primarily operated in and around Monrovia, electrification rates are frequently provided for both the entire country, and separately for the Monrovia area. Therefore, the M&E Plan attempted to report on both metrics. However, the reference to the "LEC service area" in the title implies that the entire country is not LEC's service area and therefore is misleading and inappropriate for including in the plan. |

| *Households in LEC service area that have legal connections to electricity service from LEC* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | N/A | |
| | | |
| | **Change Description:** | Retire Indicator |
| | **Justification:** | Indicator quality is determined poorer than initially thought when included in plan |
| | **Justification Description:** | This is an input to an indicator that has been retired, and has no informational value on its own. |

| *Total number of households in LEC service area* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | N/A | |
| | | |
| | **Change Description:** | Retire Indicator |
| | **Justification:** | Indicator quality is determined poorer than initially thought when included in plan |
| | **Justification Description:** | This is an input to an indicator that has been retired, and has no informational value on its own. |

| *Households that have access to a legal connection to electricity service from an electrical utility or service provider* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | N/A | |
| | | |
| | **Change Description:** | Add the following note to the "Additional Information" column in Annex I: "This indicator assumes that each residential connection reported by LEC represents one household." |
| | **Justification:** | Additional Information |
| | **Justification Description:** | N/A |

| *Customers connected to the grid* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | Baseline Modification | | | | | |
| | **Change:** | Previous | | | Revised | | |
| | Total | 34,231 | | | 36,964 | | |
| | Residential | 30,475 | | | 33,296 | | |
| | Commercial | 3,534 | | | 3,441 | | |
| | Industrial | 0 | | | 0 | | |
| | Government | 158 | | | 159 | | |
| | Other | 64 | | | 65 | | |
| | Unspecified | N/A | | | 3 | | |
| | Single-phase | N/A | | | 35,531 | | |
| | Three-phase | N/A | | | 1,236 | | |
| | CT | N/A | | | 197 | | |
| | **Justification:** | Baselines added, corrections to erroneous data | | | | | |
| | **Justification Description:** | Revised baseline values are considered more accurate because they are based on a data validation exercise completed by Tetra Tech in 2018. Additional baselines recorded for the newly-added disaggregations. | | | | | |
| | | | | | | | |
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets (Total) | 59,350 | 105,101 | 105,101 | 105,101 | 105,101 | 105,101 |
| | Revised Targets (Single-phase) | 58,000 | 103,000 | 103,000 | 103,000 | 103,000 | 103,000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Revised Targets (Three-phase) | 1,215 | 1,940 | 1,940 | 1,940 | 1,940 | 1,940 |
| | Revised Targets (CT) | 135 | 161 | 161 | 161 | 161 | 161 |
| | Previous Targets | TBD | TBD | TBD | TBD | TBD | TBD |
| | **Justification:** | TBD replaced with Target | | | | | |
| | **Justification Description:** | Targets and disaggregations established based on the Project's CBA in order to track progress. | | | | | |
| | | | | | | | |
| | **Change Description:** | Insert into the Additional Information column in the M&E Plan "The baseline value is higher than the baseline value used in the CBA model (i.e., 13,599). The former is based on LEC data as of December 2015, while the latter is based on the number of LEC customers documented in the 2014 Least Cost Power Development Plan." | | | | | |
| | **Justification:** | Additional Information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Customers connected to the grid – revised CBA* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | New indicator | | | | | |
| | **Justification:** | Relevant due to ERR recalculation | | | | | |
| | **Justification Description:** | This indicator will track progress against revised CBA projections that reflect delays in making LEC connections. | | | | | |
| | | | | | | | |
| | **Change Description:** | This indicator will have the following targets and all other indicator documentation (including baseline values) will mirror the *Customers connected to the grid* indicator. | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Targets | 38,879 | 52,792 | 66,705 | 80,552 | 94,153 | 94,153 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Targets (Single-phase) | 38,149 | 51,746 | 65,343 | 78,940 | 92,537 | 92,537 |
| | Targets (Three-phase) | 598 | 900 | 1,202 | 1,450 | 1,454 | 1,454 |
| | Targets (CT) | 132 | 146 | 160 | 162 | 162 | 162 |

| *System Average Interruption Frequency Index (SAIFI)* | | | |
|---|---|---|---|
| Project: | Energy Project | | |
| Activity: | N/A | | |
| | | | |
| | **Change Description:** | Frequency change from “Quarterly” to “Annual” | |
| | **Justification:** | Program, Project or Activity scope change | |
| | **Justification Description:** | As a quarterly indicator, this was less relevant than it will be as an annual indicator that aligns with a related Key Performance Indicator in the MSC contract (i.e., SAIDI). | |
| | | | |
| | **Change Description:** | Change definition from “Total number of customer interruptions in a quarter / Average number of customers served during the same quarter” to “Sum of all customer interruption durations/Total number of customers”<br><br>Indicator classification is changing from Level to Level (cumulative) | |
| | **Justification:** | Program, Project or Activity scope change | |
| | **Justification Description:** | In order to align with a related Key Performance Indicator in the MSC contract (i.e., SAIDI), the definition and indicator classification are updated to reflect the change to annual reporting. | |
| | | | |
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | | 25.1 | TBD |
| | **Justification Description:** | Program, Project or Activity scope change | |

| | | |
|---|---|---|
| | **Change Description:** | Baseline changed to TBD because (1) the previous quarterly value is no longer relevant, and (2) a re-baselining and target-setting effort is expected in connection with the MSC contract, and those values will be incorporated into the M&E Plan. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | N/A | N/A | N/A | TBD | TBD | TBD |
| | Previous Targets | N/A | N/A | N/A | N/A | N/A | N/A |
| | **Justification:** | Program, Project or Activity scope change | | | | | |
| | **Justification Description:** | Given the MSC's responsibility for operating LEC efficiently, SAIFI now represents a performance indicator rather than a contextual indicator and targets will help assess whether the Compact is on track to accomplish part of the Energy Project objective. | | | | | |

| | | |
|---|---|---|
| | **Change Description:** | Add to "Additional Information" column in the M&E Plan: "SAIFI is only counted at the 22 kV level and above; the number of customers associated with each feeder is estimated and is likely an underestimate.<br><br>This indicator will aggregate the monthly index values to report the quarterly and annual totals." |
| | **Justification** | Additional information |
| | **Justification Description** | N/A |

| *System Average Interruption Duration Index (SAIDI)* | |
|---|---|
| Project: | Energy Project |
| Activity: | N/A |

| | | |
|---|---|---|
| | **Change Description:** | Frequency change from "Quarterly" to "Annual" |
| | **Justification:** | Program, Project or Activity scope change |

| | | |
|---|---|---|
| | **Justification Description:** | As a quarterly indicator, this was less relevant than it will be as an annual indicator that aligns with a corresponding Key Performance Indicator in the MSC contract. |
| | | |
| | **Change Description:** | Change definition from "Sum of durations, in customer-hours, of all customer interruptions in a quarter / Total number of customers connected to network in the same quarter" to "Sum of durations, in customer-hours, of all customer interruptions in a year / Total number of customers connected to network in the same year"<br><br>Indicator classification is changing from Level to Level (cumulative) |
| | **Justification:** | Program, Project or Activity scope change |
| | **Justification Description:** | In order to align with a corresponding Key Performance Indicator in the MSC contract, the definition and indicator classification are updated to reflect the change to annual reporting. |
| | | |

| | | | |
|---|---|---|---|
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | | 109.5 | TBD |
| | **Justification Description:** | Program, Project or Activity scope change | |
| | **Change Description:** | Baseline changed to TBD because (1) the previous quarterly value is no longer relevant, and (2) a re-baselining and target-setting effort is expected in connection with the MSC contract, and those values will be incorporated into the M&E Plan. | |
| | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | N/A | N/A | N/A | TBD | TBD | TBD |
| | Previous Targets | N/A | N/A | N/A | N/A | N/A | N/A |
| | **Justification:** | Program, Project or Activity scope change | | | | | |
| | **Justification Description:** | Given the MSC's responsibility for operating LEC efficiently, SAIDI now represents a performance indicator rather than a contextual indicator and targets will help assess whether the Compact is on track to accomplish part of the Energy Project objective. | | | | | |
| | | | | | | | |

| | | |
|---|---|---|
| | **Change Description:** | Additional Information" column: "SAIDI is only counted at the 22 kV level and above; the number of customers associated with each feeder is estimated and is likely an underestimate.<br><br>This indicator will aggregate the monthly index values to report the quarterly and annual totals." |
| | **Justification** | Additional information |
| | **Justification Description** | N/A |

| *Adequacy of Supply* | | | |
|---|---|---|---|
| Project: | Energy Project | | |
| Activity: | N/A | | |
| | | | |
| | **Change Description:** | Definition Change | |
| | **Change:** | Change definition from "Average generation capacity available from all power plants divided by average peak demand in a quarter" to "the minimum value in a quarter of the following: total dependable capacity available from all power plants in a month divided by peak daily demand in the corresponding month" | |
| | **Justification:** | Corrections to erroneous data | |
| | **Justification Description:** | The new definition will yield the lowest level of the indicator in a given quarter, which is more meaningful than reporting an average for the quarter. In addition, by using dependable capacity instead of installed capacity, the indicator will better reflect the amount of power and reserves that are actually available. | |
| | | | |
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | | 0.96 | 0.95 |
| | **Justification Description:** | Corrections to erroneous data | |

| *Available Power Plant Generation Capacity* | |
|---|---|
| Project: | Energy Project |
| Activity: | N/A |

| | | |
|---|---|---|
| | | |
| | **Change Description:** | Definition Change |
| | **Change:** | Change definition from “Quarterly average of the following: total generation capacity available from all power plants in a month” to “total dependable capacity available from all power plants in the month with the lowest calculated adequacy of supply” |
| | **Justification:** | Corrections to erroneous data |
| | **Justification Description:** | This indicator is used to calculate adequacy of supply and it is more meaningful to report the lowest value of the adequacy of supply for the quarter (and its inputs) than to average the inputs as done previously. In addition, the formula was corrected to remove an error and to reference “dependable capacity” rather than “installed capacity” to increase the accuracy and relevance of the indicator. |
| | | |
| | **Change Description:** | Baseline Modification |
| | **Change:** | Previous: 10,194 / Revised: 11.94 |
| | **Justification Description:** | Corrections to erroneous data |
| | **Change Description:** | Change baseline value to reflect the revised definition. |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Change calculation described in the “Additional Information” column from “available power plant generation capacity in a month = power plant availability during the month * generation capacity * hours in the month” to “available power plant generation capacity in a month = power plant dependable capacity (MW) * hours plant was available at that capacity during month / hours in month.” |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Peak Demand* | |
|---|---|
| Project: | Energy Project |

| | | | |
|---|---|---|---|
| Activity: | N/A | | |
| | | | |
| | **Change Description:** | Definition Change | |
| | **Change:** | Change definition from “The quarterly average of daily peak demand for on-grid power in a month” to “Daily peak demand for on-grid power in the month with the lowest calculated adequacy of supply” | |
| | **Justification:** | Corrections to erroneous data | |
| | **Justification Description:** | This indicator is used to calculate adequacy of supply and it is more meaningful to report the lowest value of the adequacy of supply for the quarter (and its inputs) than to average the inputs as done previously. | |
| | | | |
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | | 10,657 | 12.6 |
| | **Justification Description:** | Corrections to erroneous data | |
| | **Change Description:** | The baseline had to be corrected from MWh to MW and from a quarterly average to the monthly value that yields the lowest adequacy of supply. The baseline value represents peak demand for March 2015, which was the month in 2015 with the lowest calculated adequacy of supply. | |

| | |
|---|---|
| *Percentage of households in LEC service area connected to the national grid* | |
| Project: | Energy Project |
| Activity: | N/A |
| | |
| **Change Description:** | Retire Indicator |
| **Justification:** | Indicator quality is determined poorer than initially thought when included in plan |
| **Justification Description:** | Because LEC has primarily operated in and around Monrovia, electrification rates are frequently provided for both the entire country, and separately for the Monrovia area. Therefore, the M&E Plan attempted to report on both metrics. However, the reference to the “LEC service area” in the title implies that the |

| | | |
|---|---|---|
| | | entire country is not LEC's service area and therefore is misleading and inappropriate for including in the plan. |

| *Percentage of households in LEC service area connected to the national grid* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | N/A | |
| | | |
| | **Change Description:** | Retire Indicator |
| | **Justification:** | Indicator quality is determined poorer than initially thought when included in plan |
| | **Justification Description:** | Because LEC has primarily operated in and around Monrovia, electrification rates are frequently provided for both the entire country, and separately for the Monrovia area. Therefore, the M&E Plan attempted to report on both metrics. However, the reference to the "LEC service area" in the title implies that the entire country is not LEC's service area and therefore is misleading and inappropriate for including in the plan. |

**Mt. Coffee Rehabilitation Activity**

| *Share of Renewable Energy in the Country* | | | |
|---|---|---|---|
| Project: | Energy Project | | |
| Activity: | Mt. Coffee Rehabilitation Activity | | |
| | | | |
| | **Change Description:** | Baseline Modification | |
| | **Change:** | Previous | Revised |
| | | 0.3 | 0 |
| | **Justification:** | Baseline change | |
| | **Justification Description:** | The denominator for this indicator is intended to capture all generation capacity in the country. However, there is a significant but unknown amount of off-grid private electricity generation capacity in Liberia. The indicator previously included off-grid renewable capacity managed by RREA, which is very small, and dilutes the indicator unnecessarily. In order to increase the indicator's accuracy and better document the significance of Mt. Coffee to LEC's generation capacity, the indicator will only refer to | |

| | | |
|---|---|---|
| | | on-grid capacity, both in the numerator and denominator. The baseline value was updated to reflect this change. |
| | | |
| | | Add the following note under the "Additional Information" column in the M&E Plan, "Given significant unknowns about private off-grid generation capacity, this indicator will only report on on-grid capacity"; the Primary Data Source will be updated to remove the reference to "and TBD," the Responsible Party will be updated to remove the reference to "RREA"; and the baseline value will be updated to exclude RREA-managed renewable energy from the numerator." |

| *Percentage of electricity supplied by Mt. Coffee Hydropower Plant* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Mt. Coffee Rehabilitation Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | 18 | 57 | 57 | 57 | 57 | 57 |
| | Previous Targets | N/A | N/A | N/A | N/A | N/A | N/A |
| | **Justification:** | TBD replaced with Target | | | | | |
| | **Justification Description:** | Targets were not originally identified for this indicator given all of the different factors that affect it. However, as a parameter in the CBA, targets have been defined in order to compare performance on this indicator to the assumptions used in the CBA. | | | | | |

| *Percentage of electricity supplied by Mt. Coffee Hydropower Plant – revised CBA* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Mt. Coffee Rehabilitation Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Relevant due to ERR recalculation |
| | **Justification Description:** | This indicator will track progress against revised CBA projections that reflect delays in making LEC connections. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | **Change Description:** | This indicator will have the following targets and all other indicator documentation (including baseline values) will mirror the *Percentage of electricity supplied by Mt. Coffee Hydropower Plant* indicator. | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | 4 | 69 | 70 | 68 | 66 | 66 |
| | Previous Targets | N/A | N/A | N/A | N/A | N/A | N/A |

| *Mt. Coffee Hydropower Plant (MCHPP) Capacity Factor* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Mt. Coffee Rehabilitation Activity | |
| | | |
| | **Change Description:** | Definition Change |
| | **Change:** | Correct definition from "Annual electricity generated by MCHPP in megawatts divided by MCHPP maximum capacity to generate power in a year" to "The ratio of the energy (MWh) generated by MCHPP in one year to the energy that it could have produced at continuous full power operation over the same period." |
| | **Justification:** | Corrections to erroneous data |
| | **Justification Description:** | The revised definition clarifies the relevant time period of the numerator and units factored into the calculation. |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Replace note in "Additional Information" column in the M&E Plan with "Formula: Annual electricity generated by Mt. Coffee (MWh)/installed capacity (88 MW) * (24 hours/day) * 365 days, i.e., Annual electricity generated by Mt. Coffee (MWh)/752,960 MWh." |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Installed generation capacity* | |
|---|---|
| Project: | Energy Project |
| Activity: | Mt. Coffee Rehabilitation Activity |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change Description:** | Baseline Modification | | | | | |
| | **Change:** | Previous | | | | Revised | |
| | | 22.06 | | | | 22 | |
| | **Justification:** | Change maintains integrity of the ERR | | | | | |
| | **Justification Description:** | There is a significant but unknown amount of off-grid private electricity generation capacity in Liberia, which complicates the reporting for this indicator, which is intended to capture all generation capacity in the country. In order to increase the indicator's accuracy, this will only refer to on-grid capacity. | | | | | |
| | | | | | | | |
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | 79 | 145 | 145 | 145 | 126 | 126 |
| | Previous Targets | 79.06 | 145.06 | 155.06 | 155.06 | 155.06 | 155.06 |
| | **Justification:** | Change maintains integrity of the ERR | | | | | |
| | **Justification Description:** | Per the explanation above, these targets account for on-grid generation capacity only, and excludes a 10MW project that has not come to fruition. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Remove references to RREA/off-grid under Primary Data Source and Responsible Party; add the following note under "Additional Information": "Given significant unknowns about private off-grid generation capacity, this indicator will only report on on-grid capacity." | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Transmission Substation Capacity Added* | |
|---|---|
| Project: | Energy Project |
| Activity: | Mt. Coffee Rehabilitation Activity |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change Description:** | Target Modification | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | Revised Targets | 122 | 122 | 122 | 122 | 122 | 122 |
| | Previous Targets | 200 | 200 | 200 | 200 | 200 | 200 |
| | **Justification:** | Corrections to erroneous data | | | | | |
| | **Justification Description:** | Initial targets for this indicator were based on an erroneous source. MCHPP has four turbines, each of which will connect to a substation with 28 MVA of capacity, with another 10 MVA being installed for auxiliary purposes. As a result, the revised target for this indicator is 122 MVA rather than 200 MVA. | | | | | |

**Capacity Building and Sector Reform Activity**

| *Aggregate Technical and Commercial Losses* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "The amount of electricity generated or input to system (kWh) minus the amount in US$ for which payment is collected from customers converted to energy (kWh) divided by the amount of electricity generated or input to system (kWh) x 100." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | TBD | TBD | TBD |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This indicator tracks all technical and commercial losses, which is a performance indicator that reflects the MSC's ability to manage the LEC network efficiently. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |

| | | |
|---|---|---|
| | **Change:** | Add the following note under "Additional Information": "AT&C = 1 – (revenue collected converted into MWh / total electricity supply (MWh)) x 100, where the annual value is an average of the monthly values"; Unit of measure: percentage; Level: outcome; Classification: level (average); Primary Data Source: LEC reports; Responsible Party: LEC Generation, LEC Commercial and LEC Finance; Baseline: TBD.<br><br>A re-baselining and target-setting effort is expected in connection with the MSC contract, and those values will be used to establish a baseline and targets for this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Commercial Losses* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "Total distribution system losses minus distribution technical losses." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | TBD | TBD | TBD |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This indicator tracks all commercial losses, which is an MCC Common indicators and reflects the MSC's ability to manage the LEC network efficiently. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Add the following note under "Additional Information": "$\%Com = \%Gen - \%Ttl - \% Ct = \%EAfS - \%Dtl - \%Billing$; where Energy Generated (Gen) = 100%; consumption at transmission level (Ct) = 0 (because there are currently no transmission-level customers); transmission technical loss (Ttl) is estimated at 3%; Energy Available for Sale = EAfS; Distribution Technical Losses (Dtl) are estimated at 12%; Billing = LEC Internal | | | | | |

| | | |
|---|---|---|
| | | Consumptions + Energy billed to consumers; Unit of measure: percentage; Level: outcome; Classification: level (average); Primary Data Source: LEC reports; Responsible Party: LEC Generation, LEC Commercial and LEC Finance; Baseline: TBD.<br><br>A re-baselining and target-setting effort is expected in connection with the MSC contract, and those values will be used to establish a baseline and targets for this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Maintenance expenditure - asset value ratio* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "Actual maintenance expenditures / Total value of fixed assets." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 2% | 2% | 2% |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an MCC Common Indicator that gives an indication of whether the utility is conducting appropriate preventative, operational, or corrective maintenance to existing assets. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: percentage; Disaggregation: N/A; Level: outcome; Classification: level; Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 0.4. | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Maintenance expenditures* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as “Actual maintenance expenditures” | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 10,275,000 | 11,491,000 | 11,491,000 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an input to an MCC Common Indicator that gives an indication of whether the utility is conducting appropriate preventative, operational, or corrective maintenance to existing assets. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: USD; Disaggregation: N/A; Level: outcome; Classification: level; Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 790,000. | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Asset value ratio* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Management Support to LEC Sub-Activity | |
| | | |
| | **Change Description:** | Indicator Addition |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Change:** | Addition of indicator that is defined as "Total value of fixed assets." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 503,783,000 | 497,381,000 | 497,381,000 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an input to an MCC Common Indicator that gives an indication of whether the utility is conducting appropriate preventative, operational, or corrective maintenance to existing assets. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: USD; Disaggregation: N/A; Level: outcome; Classification: level; Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 202,162,000. | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *New Connections Added Each Year* | | | | | | | |
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "Customer connections executed during the performance period that have been registered with LEC and added to the customer database." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | TBD | TBD | TBD |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This indicator is a Key Performance Indicator under the MSC contract and maps directly to bonus payments, and therefore | | | | | |

| | | |
|---|---|---|
| | | presents a different perspective on customer connections than *Customers connected to the grid*. |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Unit of measure: number; Disaggregation: LEC/donor; Level: outcome; Classification: level (cumulative); Primary Data Source: LEC reports; Responsible Party: LEC Commercial; Baseline: N/A |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Operating expenses per kWh sold* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "The total operating expense divided by kWh sold." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | $0.52 | $0.29 | $0.29 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | Added to align with a Key Performance Indicator in the Management Services Contractor's (MSC) contract, and establish targets against which to track performance. This indicator gives an indication of the economic sustainability of the utility over time, and when compared to the value of the average tariff rate, it indicates whether the utility is operating at a profit or a loss. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Add the following note to the "Additional Information" column in Annex I: "'Total operating expense' includes: at least the fuel costs, O&M expenses, administrative expenses (salaries & benefits, outside services, insurance claims, foreign travel, vehicle expenses, LEC Board expenses, other administrative expenses etc.) | | | | | |

| | | |
|---|---|---|
| | | and other expenses such as depreciation, interest and foreign exchange gain/loss."<br><br>Unit of measure: USD; Level: outcome; Classification: level (average); Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: $0.58.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of operating expense per kWh sold reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Operating expenses* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "The total operating expense in a year" | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 45,503,000 | 66,099,000 | 66,099,000 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | Input to an indicator that was added to align with a Key Performance Indicator in the Management Services Contractor's (MSC) contract, and establish targets against which to track performance. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Add the following note to the "Additional Information" column in Annex I: "'Total operating expense' includes: at least the fuel costs, O&M expenses, administrative expenses (salaries & benefits, outside services, insurance claims, foreign travel, vehicle | | | | | |

| | | |
|---|---|---|
| | | expenses, LEC Board expenses, other administrative expenses etc.) and other expenses such as depreciation, interest and foreign exchange gain/loss."<br><br>Unit of measure: USD; Level: outcome; Classification: level (average); Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 20,909,000.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of operating expenses reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Total Electricity Sold (kWh)* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | Management Support to LEC Sub-Activity | | | | | | |
| | | | | | | | |
| | **Change Description:** | Indicator Addition | | | | | |
| | **Change:** | Addition of indicator that is defined as "The total kilowatt hours of electricity sales to all customer types." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 127,687,000 | 140,053,000 | 140,053,000 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | Input to an indicator that was added to align with a Key Performance Indicator in the Management Services Contractor's (MSC) contract, and establish targets against which to track performance. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |

| | | |
|---|---|---|
| | **Change:** | Unit of measure: kWh; Level: outcome; Classification: level (average); Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 36,278,566.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of electricity sales in kWh reflects the amount of electricity sold from July 1, 2014 – June 30, 2015. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Operating cost recovery ratio* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | New indicator | | | | | |
| | **Change** | Addition of indicator defined as "Total revenue collected / Total operating cost." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 64% | 115% | 115% |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an MCC Common Indicator that gives an indication of the economic sustainability of the utility over time but this is based in collection. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: percentage; Disaggregation: N/A; Level: outcome; Classification: level (cumulative); Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 88%.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of operating cost recovery ratio reflects the July 1, 2014 – June 30, | | | | | | |

| | | |
|---|---|---|
| | | 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Total Revenue Collected* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | New indicator | | | | | |
| | **Change** | Addition of indicator defined as "Total revenue collected." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 29,093,000 | 76,342,000 | 76,342,000 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an input to an MCC Common Indicator that gives an indication of the economic sustainability of the utility over time but this is based in collection. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: USD; Disaggregation: N/A; Level: outcome; Classification: level (cumulative); Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 18,395,000.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of total revenue collection reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *Collection Rate* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Energy Project | | | | | | |
| Activity: | Capacity Building and Sector Reform Activity | | | | | | |
| Sub-Activity: | N/A | | | | | | |
| | | | | | | | |
| | **Change Description:** | New indicator | | | | | |
| | **Change** | Addition of indicator defined as "[Trailing twelve months of total value of post-paid bills collected /Total value of bills issued for same customers in trailing twelve months] x 100." | | | | | |
| | **Change:** | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | End of Compact |
| | | N/A | N/A | N/A | 91 | 98 | 98 |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria | | | | | |
| | **Justification Description:** | This is an MCC Common Indicator that gives an indication of the economic sustainability of the utility over time. | | | | | |
| | | | | | | | |
| | **Change Description:** | Additional Information | | | | | |
| | **Change:** | Unit of measure: percentage; Disaggregation: N/A; Level: outcome; Classification: level; Primary Data Source: LEC reports; Responsible Party: LEC Finance; Baseline: 77.4.<br><br>Because the baseline value for LEC's financial indicators reflect LEC's fiscal year (i.e., July 1-June 30), the baseline value of the collection rate reflects the July 1, 2014 – June 30, 2015 period. The Y4 and Y5 targets represent calendar years, which is how data will be reported against this indicator. | | | | | |
| | **Justification:** | Additional information | | | | | |
| | **Justification Description:** | N/A | | | | | |

| *LEC Customer Service Center Renovated* | |
|---|---|
| Project: | Energy Project |
| Activity: | Capacity Building and Sector Reform Activity |
| Sub-Activity: | N/A |

| | | |
|---|---|---|
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward upgrading LEC's customer service capacity |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date LEC Waterside customer service center has been reopened for service following completion of renovation"; Unit of measure: date; Level: output; Classification: date; Primary Data Source: TBD; Responsible Party: MCA-Liberia; Baseline: N/A; Target: 10/31/20 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

**Establishment of an Independent Regulator Sub-Activity**

| *LERC management structure established* | |
|---|---|
| Project: | Energy Project |
| Activity: | Capacity Building and Sector Reform Activity |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity |
| | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date the following LERC positions have been filled: three Commissioners, Managing Director, Head: Licensing & Public Affairs, Head: Economic Regulation, Head: Technical Regulation"; Unit of measure: date; Level: outcome; Classification: date; |

| | | |
|---|---|---|
| | | Primary Data Source: Quarterly update; Responsible Party: LERC; Baseline: N/A; Target: 12/31/2019 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Interim LEC tariffs approved by LERC* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date LERC has approved interim tariffs for electricity sold by LEC"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: Board of Commissioner's Tariff Approval Resolution or Decision; Responsible Party: LERC; Baseline: N/A; Target: 11/30/2019 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *LEC licensed as an electricity operator* | |
|---|---|
| Project: | Energy Project |
| Activity: | Capacity Building and Sector Reform Activity |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity |
| | |

| | | |
|---|---|---|
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date LERC has issued a license to LEC to operate as an electricity provider"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: license to operate; Responsible Party: LERC; Baseline: N/A; Target: 12/31/2019 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Non-LEC entity licensed as an electricity operator* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date LERC has issued a license to a non-LEC entity to operate as an electricity provider"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: license to operate; Responsible Party: LERC; Baseline: N/A; Target: 2/29/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *LERC officially launched* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date of public event with key sector stakeholders to announce the launch and functioning of LERC"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: Press release; Responsible Party: MCA-Liberia; Baseline: N/A; Target: 3/31/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *LERC inaugural budget approved* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |

| | | |
|---|---|---|
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date LERC's inaugural budget for fiscal year 2021 (covering July 1, 2020 through June 30, 2021) has been approved by Board of Commissioners"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: LERC budget; Responsible Party: LERC; Baseline: N/A; Target: 3/30/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *LERC inaugural budget passed into law* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date Board of Commissioner-approved inaugural budget has been passed into law by National Legislature"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: National budget that has been approved by the legislature and signed into law by the President; Responsible Party: MCA-Liberia; Baseline: N/A; Target: 9/30/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *LERC regulatory framework approved* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |
| | | |
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: "Date that the following components of a regulatory framework have been approved by LERC: (1) licensing regulations (which will include quality of service and system planning regulations); (2) licensing manual; (3) tariff regulations; and (4) quality of supply regulations"; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: Quarterly update; Responsible Party: LERC; Baseline: N/A; Target: 12/31/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |

| *Dispute resolution procedures approved* | | |
|---|---|---|
| Project: | Energy Project | |
| Activity: | Capacity Building and Sector Reform Activity | |
| Sub-Activity: | Establishment of an Independent Regulator Sub-Activity | |
| | | |
| | **Change Description:** | New indicator |
| | **Justification:** | Existing indicators do not sufficiently meet adequacy criteria |
| | **Justification Description:** | This indicator will track progress toward establishing a fully functional independent regulator |

| | | |
|---|---|---|
| | **Change Description:** | Additional Information |
| | **Change:** | Definition: “Date LERC has approved procedures to address customer complaints and other related disputes”; Unit of measure: date; Level: outcome; Classification: date; Primary Data Source: Quarterly update; Responsible Party: LERC; Baseline: N/A; Target: 12/31/2020 |
| | **Justification:** | Additional information |
| | **Justification Description:** | N/A |